July/Aug 1997
No 46
$3.95 US
$5.50 Canada

Backwoods Home magazine

practical ideas for self reliant living

8 Great Ways to Make Money in the Country

COOL YOUR HOME
DRIP IRRIGATION
WILD GARLIC
SUPER SQUIRT GUN
MAKE A SUNDIAL

My view

The militia movement

In a recent issue of *U.S. News and World Report*—a news magazine I had thought was more objective than liberal-leaning magazines like *Time* and *Newsweek*—there appeared a major article titled "Mainstreaming the militia." Far from being the objective piece I had hoped for, it was yet another distorted mainstream media reporting about the goings on of America's mushrooming militia movement.

The article painted militia groups and other anti-government groups as being composed of unemployed, low-income, uneducated, paranoid, and easily-led misfits who are seeking to blame someone—the U.S. Government, the United Nations, the New World Order, or whatever——for their troubles. *Backwoods Home Magazine* was mentioned as one of the "magazines that have sprung up to compete for the antiestablishment audience."

The article has all kinds of references to the Oklahoma City bombing, potential violence by militia groups to revenge the Waco massacre or to mark the anniversary of the Oklahoma City bombing, and the suspicion by federal agents that the militia groups are planning all sorts of violence just as an outlet for their hate and extremism.

The supposed "sources" for the information in the article comes from groups, publications, and Internet sites with explosively ominous names like Klanwatch, Center on Hate and Extremism, the Hate Directory, the Program for the Study of Violence and Conflict, Skinheads USA, the Ku Klux Klan Home Page, Library of a White Tribalist, and Aryan Nations. And, of course, the books and videos these outfits sell have titles like *Hitman, How to Kill*, and *Ultimate Sniper* to "help Americans preparing for a race war," among other dastardly things. And, of course, these dangerous nuts all hang out at the "notorious" Preparedness Shows that are popping up all over the country.

Now let me qualify my annoyance with this distorted and misleading *U.S.News* article by saying that neither I, my staff, nor *Backwoods Home Magazine* have membership in any militia group or other anti-government group. This is not intended as a statement to back away from these people in any way, but as an assertion that we are an independent publication that is interested in the fair treatment of all Americans, be they militia groups from America's political right or environmental groups from America's political left.

That said, I can tell you during the eight years of *BHM's* existence, I have met many militia members at the various Preparedness Shows I have attended and I have met many environmentalists at the various environmental and energy shows I have attended. The most prominent of these people, such as John Trochmann (pictured prominently and ominously in the *U.S. News* article as the head of the "notorious" Montana Militia), and John Schaeffer (always displayed favorably in the media as the environmentally-aware owner of Real Goods Corporation), are exceptionally smart businessmen and exceptionally good family men. As with other prominent people on both the left and the right, they have their hangers-on who are jerks.

What angers me, being libertarian and conservative, is that I have never, in eight years of attending these shows in cities from Boston to Denver to Los Angeles, read anything in the mainstream media that was negative about environmental shows, or that was positive about Preparedness Shows. Even though, in my observations, the environmental shows are full of environmental crackpots, many of whom would be willing to resort to violence to promote their agenda (Remember the Unabomber and tree spikers?), and the Preparedness Shows, though plagued by their own share of crackpots, by and large are attended by well-educated, well-informed, sensible people whose chief sin seems to be demanding the government behave in accordance with the Constitution.

So why the difference in press coverage? In a nutshell: The environmental shows are full of liberals who want to promote government intervention to save the world as they think it should be, and the Preparedness Shows are full of conservatives and libertarians who want to limit government intervention so as to save America the way they think it should be. If you are liberal, you get good press; if not, you get tagged as a racist, extremist, or nutcase. It just makes me so mad I could spit.

Well, at least the *U.S. News* article was partly right when it said the militia movement is becoming more mainstream, but it underestimates the appeal. Instead of the six Preparedness Expos it said are planned for this year, there are at least 19. They are in cities like Orlando, Portland, Indianapolis, Phoenix, Kansas City, San Francisco, Albuquerque, San Antonio, Nashville, Tulsa, Detroit, Philadelphia, Pittsburg, Buffalo, St. Louis, Columbus, San Diego, and Dallas. Some have already taken place.

You see, *U.S. News*, Americans aren't really influenced by how much you or the rest of the mainstream media distort the meaning of a legitimate American movement. They've been down this freedom road before. And what the militia movement is in America is a healthy exercise of freedom—what freedoms we have left—to oppose the excesses of our own government. If it has racists and extremists on its fringes, so does every other movement this country has ever had. You concentrate on the fringes to pull off your distortion, but big government zealots like you have never been able to stamp out the real truth with your high profile distortions.

The *U.S. News* article is right about one thing, and I'll quote it: "...the mainstreaming of the militia movement has just begun." Δ

Multi-level marketing — is it the road to riches or disaster?

By Katharine B. Reader

I'm a freelance writer. I also manage properties, organize events, and am good at squeezing weeks of work into days. For me, time is life. I don't like to waste it. This is the story of my three-year involvement with one of the top multi-level marketing companies in the country. Although the names have been changed, the essential information is correct and paints a clear picture of what the vast majority of people who venture into MLM have no way of knowing beforehand but later wish they had.

Back in late summer of 1991, I'd just finished a book I'd been working on for a long time and was having that kind of "what next" feeling some of us get when one thing has ended and the next has not yet begun. One rainy afternoon, the phone rang. It was my friend Stan.

"K.B., you're not going to believe this. I just got involved in something incredible "What's her name, Stan?" I said. "Does your wife know about this?"

"No, no, it's nothing like that! It's a fantastic business opportunity! With your looks, your brains, and your contacts, you'd be perfect! Can you come over Tuesday at 7 p.m.?"

"What is it?" I asked.

"I couldn't possibly do justice to it over the phone. K.B., this is big! You and I are going to make a lot of money! Just be at my place Tuesday night! Trust me!"

Reluctantly, I agreed to go. Stan lives near San Francisco, in Berkeley, and I was living across the Bay in north Marin, but he was a friend and I owed him a favor.

I arrived late. Six other people were there, none of whom I knew. There was a chalkboard set up in front of the fireplace and Stan was drawing circles on it.

"Hey, K.B.! Great to see you! Alice, could you move over so my friend can fit in there? I was just showing these people the Company's unbelievable marketing plan …" He continued drawing circles on the chalkboard. There was a big one on top that had "you" in the middle with rows of smaller ones underneath. It looked like a pyramid. "...and you sign up five and they sign up five and they sign up five ... soon hundreds of people are making you money!" I was thinking about my bed. Then Stan

said, "The top 80 distributors averaged almost $70,000 a month last year and had plenty of free time to enjoy it. And most of them dropped out of high school! Anyone can do this business!"

His wife got up and started passing out samples of this powdered stuff mixed with water, along with some pills, and telling stories about how their neighbor across the hall lost 60 pounds and grew back all his hair and traded his wife in on a younger model, etc.

I'm not sure why I got involved. I knew even $5,000 a month in passive income would make me financially independent. Stan said I could easily earn that working half-days from home, giving me even more time to write. Stan was well aware that freedom in all its forms, living to my potential, and helping other people live to theirs were my highest values. He said the business offered the ultimate opportunity for expressing those values by helping friends and loved ones, as well as myself, improve our health and change our lives. It sounded too good to be true!

I've always believed in giving things my best shot, so I took the business seriously and listened to my sponsor. "You won't make peanuts selling products," Stan said. The name of this game is, 'Sell the dream!"' I invested $1,000 in the recommended assortment of products and started calling everyone I'd ever known to invite them to meetings or ask for referrals.

I let my writing go. There was no time for it. I was driving 300 miles a week to talk with prospects or cart them to meetings. Stan was ecstatic; my family was suffering.

Stan assured me if I hung in we'd make a fortune in two years, max. He said the ones who failed were lazy quitters. Anyone could make it if they worked hard enough! I was working twelve to fourteen hours a day, seven days a week, looking forward to financial freedom and the gratitude of my friends and loved ones. Unfortunately, the people I most wanted to save were not interested, but I signed up a lot of others. Most of them dropped out but enough stayed in to keep me going. I'd spent most of my savings so I really couldn't afford to stop. I liked the products, took care of my customers, and referred customers to the people in my group. Sometimes I signed new distributors under mine to help them along. I wanted the business to work for everyone.

In December of 1992, Sarah, an old friend and one of my best people, called to say she was quitting. She was out of money and out of contacts. Her friends were avoiding her. I was devastated! I was almost as invested in my group's success as I was in my own, quite literally, since I would buy "sales volumes" from time to time for those who couldn't make their quotas

(a practice unofficially endorsed by the Company). I was pretty far out on a limb.

Sarah wasn't right for multi-level marketing. She was intellectual and shy, not at all a salesperson. She tried to quit three times and three times I talked her out of it. I told myself it was for her good, but it was for mine. I couldn't afford to lose her. Sarah fell into a depression and her boyfriend left her. She stopped returning my calls. I lost more than a business partner; I lost a friend.

"Forget about females!" Stan said. "Recruit men! They're less emotional. This is a numbers game! Just say 'Next!' (the MLM mantra), get your fanny off the floor, and go sign up some more people!" That's what I did.

Larry was an ambitious real estate agent bound for success. He called one day to say, "I just signed up a single mother who lives in a trailer with her four children! Last month she was diagnosed with lymphatic cancer but she's really excited about turning her life around. She sold $1200 worth of their furniture to get started!" This stopped me cold. I called Stan and told him I did not want to make money in this way. Stan said I couldn't hold myself responsible for the actions of others and, who knows? Maybe it was her only chance to turn her life around. I swallowed my conscience and said a prayer for the single mom as I reinvested the small commission she had made me.

I'd been in the business almost three years and was climbing the ladder of success. In July 1994, Stan's sponsor, Max, organized a gathering of top distributors, the ones making the "big bucks" they dangled like carrots in front of their followers. A few lesser beings, including me, were invited. One of the stars, an ex-football coach, said, "MLM is a legal pyramid. If it were an opportunity for everyone, it wouldn't be an opportunity for anyone. Just put on blinders and go for it! It won't last forever. He led us in some goal-setting exercises to help us clarify what we want from life and how the business could help us get it. I began to open my eyes. What I saw were a bunch of burnt-out, grumpy egomaniacs, fighting amongst themselves and looking not at all like I'd seen them at the conventions or sounding like I'd heard them on tape. I asked myself if this was where I was going and if these were the people I wanted to go with. The answer was, "No!" I decided to quit. Stan, like so many before him, had run out of money and dropped out, so Max talked me into staying. His success, after all, depended on the efforts of workaholics like me lower down on the pyramid. The "dream" was turning into a nightmare.

The following week there was a message on voice mail about the "Fortune 5000 Club," referring to distributors earning monthly commissions over $5000. I wondered how many of the 110,000 or so active distributors were in the Club. I called distributor services and was told, "The Company does not release that information!" If this business taught me anything, it taught me how to persist. I called back and got a new person who evidently didn't know the Company's policy on covering up the facts. She told me that it was about 200. I was stunned! When confronted with that figure, the person I first spoke with reluctantly confirmed it. I asked why information like this was withheld from us. His answer was, "If people knew the numbers, no one would sign up!" I think he went on unemployment shortly after that.

I felt like an idiot. Out of curiosity, I called four or five other multi-level companies I hoped would be more forthright. The responses I got were variations on, "That information is not available, but would you like to hear some testimonials, buy some products, or sign up?"

And what about those 80 distributors *averaging* $70,000 a month? After travel, trainings, entertainment, phone and mail costs, samples, sales aids, products, office supplies, volume buyings, and audits by the IRS, the vast majority were a far cry from breaking even. As for the few at the top whose incomes ($800,000, $900,000 a month) skew the numbers, their contempt for the thousands behind them picking up the pieces of their dreams makes those slick TV evangelists look like Santa Claus. The meaning of "It's a numbers game!" suddenly became clear. I had unwittingly involved myself in a "win-lose" of unthinkable magnitude.

Max insisted that what distributor services had told me couldn't possibly be correct, but admitted he didn't know himself. After making some inquiries, his spiel was that even if only one person were in the Club, the potential was there for everyone. I said, "Yeah, and you can potentially win the lottery too, but I'm not going to be selling tickets to my friends." I quit without looking back.

Two and a half years later I still haven't cleared that business out of my life. Like fleas, it infested everything: bathrooms, pantry and file cabinets, video shelves, car, and garage. The worst was that it infested my friendships, separated me from my family, and almost made me forget who I am and what I want my life to stand for. What amazes me most is that it took so long to see it. Almost as amazing is that of the dozens of people who have tried to involve me in their MLMs (which, of course, are "completely different" from all the other MLMs!) only three that I know of have asked their companies how many distributors are at the income level to which they aspire. These three were told, "The Company does not release that information."

I guess the rest went "Next!," adjusted their blinders, and continued on down their lists. Do I have any advice on what to do if you're prospected by an MLMer? You bet! It's simple: Just say, "No!" I remember that Max used to say, "Even if you win the rat race, you're still a rat." Δ

For lots of summer fun, make a super squirtgun

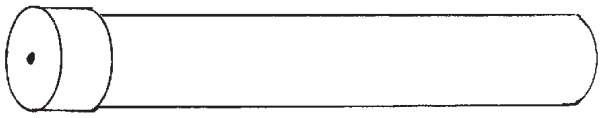
By Rev. J.D. Hooker

OK, all of you *BHM* readers who are parents or grandparents . . . I'd like you to take a moment to think back to the hot summertimes when you were a kid. What was the most fun you could have on a really hot summer afternoon? Probably one of the first things that will pop into your mind will be a good old-fashioned water fight. Whether you used squirt guns, garden hoses, buckets, or whatever, there just isn't any way that you could forget that.

I sure can remember some of the water fights we had, and I remember the homemade water guns we used, too. Whenever anyone bought a new carpet in those days, it came rolled up on this magnificent bamboo pole. That pole was the prize that every kid within miles was wishing for. We'd take each separate bamboo node, a piece of sturdy stick, and some scraps of rubber or leather (or even scraps from the carpet itself), and we'd make the finest long-range water guns anyone had ever seen.

Carpet doesn't come rolled on those bamboo rods anymore, but the plastic plumbing pipe that's so common today offers an even better alternative. So for a couple of bucks or so (less if you've got some scrap left from a plumbing project) you can provide your own kids or grandkids with some really terrific summer fun that they'll remember all of their lives.

Putting this water-gun together is so simple that the drawings are self-explanatory, and you really don't need any other instructions. So I'm not giving you any. You can get busy right now and make up a couple for your kids.



Start with a 12 - 14" length of 1 - 1½" plastic water pipe. Drill a ⅛ - ¼" hole in an end cap and glue it on the pipe.

Cut several disks from heavy leather or rubber to fit inside the pipe. Tack or screw the disks to the end of a dowel or an old broom handle cut to length.

Fill with water and push on the dowel.

Just remember to make one for yourself, too, because your kids will be having so much fun that you'll end up needing your own for self-defense. Δ

Build a seed starter and make a nice part-time garden income

By Alice Brantley Yeager
(Photos by James O. Yeager)

Gardening is an occupation or hobby that has unlimited potential attached to it. We all know about the health and economic advantages, but there's another angle to gardening. It can be downright lucrative if one uses his or her know-how to promote the sale of not only surplus produce but plants as well. A produce stand can be a real source of revenue without any outlay for rent, utilities, etc. if it is located on the owner's property. Weather conditions will determine the feasibility of the time of year to open or close the stand.

The moment there's a hint of spring in the air, folks who have just been through the rigors of winter begin to change from their cold weather habits to wanting to get out and stir around. Many of them are already planning on what to plant in their gardens and yards, and if they know where there's a likelihood of finding a treasure-trove of plants, they'll head for that place. If the seller is wise, he'll have a wide range of varieties on hand rather than just the run-of-the-mill types.

I found out years ago that it was useless to try to buy certain varieties of tomato plants. Only the more popular ones were for sale like Better Boy, Big Boy, Early Girl, etc. The firmness and round shape of these varieties please some folks, but I like a home-garden type of tomato—one that doesn't ship well because of its tenderness and one that has that great tomato flavor not found in the firmer commercial type of tomatoes grown by the acre. Other vegetable plants not usually found for sale are Malabar spinach, New Zealand spinach, French sorrel, and so on. You'll find a few herb plants in the larger plant and nursery displays, but not usually in the smaller ones.

The same thing goes for flowers. How many Inca marigolds do you find for sale? Not many, if any. There will be a number of marigolds ranging from those that are supposed to drive out nematodes to dwarf, giant-flowered plants, but no Incas. Try finding melapodium plants—those native "newcomers" that add a splash of color to the garden all summer long. Forget it. Maybe you like a touch of blue in the garden. Native ageratum, a perennial, start blooming in late summer covering its plants with a mass of azure-colored, fringe-type blossoms. Chances are, you'll find only the dwarf, annual varieties of ageratum for sale unless you are fortunate enough to have access to a native plant nursery.

*Transplanting seedlings from a seedstarter is easy if the *plants are not crowded*

You can see that there are gaps to be filled in the plant market, and with a little time and patience a person interested in gardening can make a profitable niche for himself. Most of us do not have large commercial type greenhouses at our disposal, but we can turn out hundreds of seedlings with the use of a simple mini device known as a seed starter. I have used one for years to acquire the special plants I want to try in our garden. Husband James made the present seed starter and it has been in use for several years. Prior to his building the starter, I had been using seed starters offered in catalogs and some of them were really flimsy. The last one ordered was so fragile that it was already cracked when it arrived. I should have known better than to buy a starter made of plastic, but I didn't have much choice. At least the company was nice enough to give me a refund.

Anyone with woodworking skills can make a seed starter. However if you are not strong on woodworking, seek out someone with the ability and present him with the illustration and material list accompanying this article. I'll bet he'll say, "It's a piece of cake—no problem" (Don't forget to ask what his charge will be. If it seems a little steep, shop around.)

For the average gardener the sunny windowsill loaded down with various pots planted with seeds becomes obsolete when a seed starter is acquired. (If the family mouse catcher accidentally knocks off a pot or two, what a mess!) Damping-off of young seedlings is practically non-existent when one uses a seed starter.

To begin using the starter, level about 2½ inches of good grade potting soil in the base. Do not use bargain-brand potting soil, as it is usually of inferior quality and either cakes or has all the water retention properties of a sieve. Ask your garden supplier for the best type soil he has explaining what you are going to do with it. After leveling the potting soil, moisten it with enough fresh water to make it moist but not soggy. Be cautious with water, too, as you do not want to transfer bacteria to the soil by perhaps

The variety Sweet Million, a variety of cherry tomato, gives a heavy yield of sweet tasting, delicious tomatoes.

using rainwater. Rainwater is all right for larger plants, but I do not use it in a seed starter. If the potting soil settles a bit after watering, add a little more soil to maintain the 2½ inch depth. Plug in the starter, let it warm up for a few hours or overnight and you're ready to proceed with seed planting.

Do not use the same potting soil in the starter year after year, as it could lead to a disease organism build-up. Empty the old soil at the end of the season, let the starter dry out during summer and begin anew with fresh potting soil. Old soil could be sterilized by heating it in an oven, but it's a lot less trouble to use it for something else and begin afresh with new soil.

When planting seeds, remember to put the rows far enough apart so as to allow room to handle the seedlings when transplanting them to peat pots, etc. If plants are crowded, it's hard to keep from damaging some of them when removing them from the starter. Some seedlings are so small—i.e., petunias, begonias, celery and others—that it is very hard to deal with individual plants if seeds have been too thickly sown. For depth of planting, follow directions on seed packets.

Don't forget to insert markers at the beginning of each row showing names of plants and dates planted. Varieties of tomatoes, peppers, etc., look an awful lot alike in the seedling stage. So do various shades of impatiens, zinnias, periwinkles and others. If you want to keep colors separated, labels are imperative.

Dates are important in order to keep up with germination times. Pre-cut markers are available from supply houses, but strips cut from empty plastic bleach bottles (rinsed) work just as well. Wax freezer pencils are ideal to use for labeling the markers.

Young seedlings need plenty of light to keep them from being spindly. Long periods of gloomy days inhibit growth, so artificial light should be provided. This can easily be done by suspending a planter light just above the starter. There are a number of lights available from garden supply houses.

The temperature in the seed starter should be maintained at 70'-75' F.

Heating cable thermostats are Preset for 74 degrees F., and current will cut off when temperature rises above that. If the air temperature surrounding the seed starter rises above 80 degrees F., I prop the starter open an inch or two to allow air to circulate and lower the temperature.

Plants will not need much watering once the soil is thoroughly dampened. Moisture collecting at the top of the seed starter will drip slowly back into the base much as it does in a terrarium. Touching the soil or watching for changes in its color will reveal whether or not it is too dry. I keep a moisture meter handy in case I'm uncertain about watering. I like to keep seedlings healthy by watering with a liquid plant food and I continue feeding them after they have been transferred out of the starter.

It is amazing how many plants can be produced by using a seed starter. By planning ahead and making inquiries of other gardeners, a thrifty owner can have hard-to-find varieties ready for spring sale, as well as fall, and once folks become accustomed to being able to purchase them, customers will come back year after year.

You can have fun with a seed starter, too. Early each spring I plant Sweet Million tomato seeds in my starter and sponsor a contest for a chapter of retired persons. In celebration of National Gardening Week (2nd week in April), I distribute the plants to members who want to enter the contest. All during the tomato season members keep account of tomatoes harvested from one plant only. (No drop-offs or damaged tomatoes may be counted—only edibles.) At our October meeting on Columbus Day, the members having harvested the most tomatoes wins a prize. So far, no one in the group has beaten one member's record of 2,098 edible tomatoes. Whether you want to raise plants for your own use or be known as mogul of the plant industry, it can all be possible by beginning with a single seed starter!

Some Sources for Seeds

Malabar Spinach
New Zealand Spinach
Pinetree Garden Seeds
Box 300
Gloucester, ME 04260

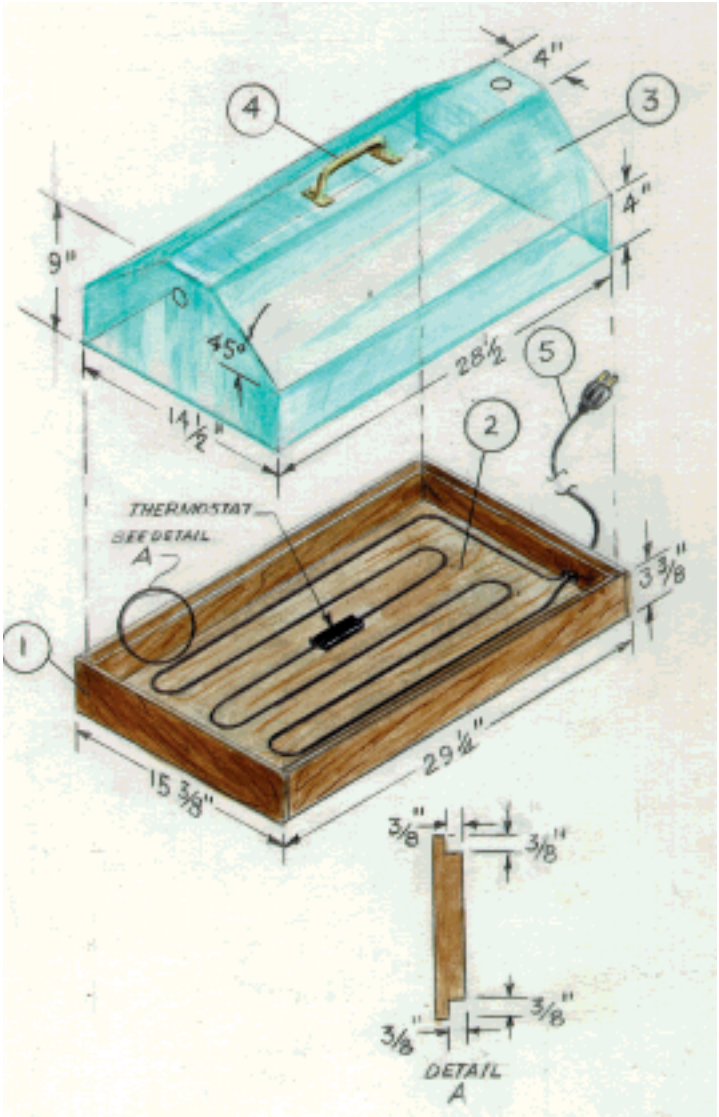
French Sorrel
Park Seed
1 Parkton Ave..
Greenwood, SC 29647-0001

Inca Marigolds
Melapodium
Park Seed

Sweet Million Tomato
Pinetree Garden Seeds

Park Seed

J. W. Jung Seed Co.
335 S. High St.
Randolph, WI 53957-0001 Δ



-"A"- End view of side for seed starter showing cut out for bottom & cover

Material list to build a seed starter

1 - 8-foot long 3⅜"- by ⅝" board. Redwood or cyprus should be used for durability.
1 - 18" by 30" ⅜-inch piece of exterior plywood.
1 - 30" by 40" ⅛-inch thick piece of Plexiglas.
1 - Screen door-type handle.
1 - 12-foot long, 42 watt, electric soil heating cable with 74 fegree F. thermostat.

Materials listed may be purchased at most building supply companies. Following are some sources for heat cables:
Park Seed, 1 Parkton Ave., Greenwood, SC 29647-0001
J.W. Jung Seed Co., Randolph, WI 53957
A.M. Leonard, Inc, 241 Fox Drive, P.O. Box 816, Piqua, OH 45356

Directions for building seed starter

1. For base of seed starter, cut board to correct lengths for finished overall dimensions as shown on sketch. Rabbet out a ⅜- by ⅜-inch groove on edges of boards so that a groove will form all the way around the inside edges of the sides when assembled. This will give a snug fit for the Plexiglas top and also the bottom board.
2. Before installing the bottom board, cut a notch in one end board for the heating cable to go through. Curve the cable back and forth and secure to the bottom with electrician's tape. Be sure that thermostat ends up in middle of bottom.

Optional. If desired, a metal liner of aluminum or 28 - 30 gage galvanized steel may be installed in the base as it will add to the life of the starter. If a liner is used, install immediately after assembling the base and tape the cable to the liner. Bend down the edge of the metal where the wire touches it going through the end of the seed starter as this will eliminate damage to the insulation on the wire.

3. The Plexiglas top may be cut with a power saw using a plywood blade, and pieces shown may be assembled with glue from a hobby shop, or you can use metal angle brackets with bolts, washers, and nuts. Cut vent holes 1" diameter on each end at the top.
4. With bolts and nuts, fasten a screen door type handle to the Plexiglas top. This will provide ease for handling top.
5. Before plugging in the heating cable, fill base the with 2½ inches of moistened potting soil. Allow a few hours for the soil to warm up before using the starter. Δ

Roadside marketing: the best of two worlds

By Robert L. Williams

Throughout rural America farmers on a large scale and gardeners on a postage-size plot of land grow incredible amounts of food or flowers or decorative plants. Given good weather and a little help with pest control, nearly anyone with a smidgen of know-how can produce the basic vegetables and fruits that fill the plates of many Americans.

But what do you do with the produce once you have grown it? Many gardeners take the simple way out and give away much of what they grow. Some growers endure the frustrations of getting their crops harvested and then the added worry of trying to get some kind of reasonable payment from the supermarket chains.

However, there is a rapidly growing number of growers who have decided to concentrate on the best of two worlds: they not only grow their produce but they market it directly to customers as well. And along the way they eliminate the middle man and put his share of the income into their own pockets.

Bob Mosteller grows some of his produce and buys the rest from local farmers and from wholesalers. He has found that selling at a low profit and increased volume works.

Fitzhugh McMurry opened a roadside market in a building that had been a service station, and his customers increase—as do his profits—each month.

When you drive along rural roads in summer and fall months, you often see produce stands—usually innocuous sheds built of scrap lumber and covered with metal roofing salvaged from an old barn. But you may have noticed that there is a new kid on the block: the farmer who has built a neat, sturdy, and roomy market on the edge of his property and in full view of passing motorists who are shopping for bargains in food.

The bargains are there

As part of a survey for this article, I visited several large supermarkets and priced items usually in great demand: apples, grapes, tomatoes, lettuce, and other common items found on the tables of many Americans.

Here's what I found. At the supermarkets grapes sold for about $1.89 per pound, as did tomatoes. Vidalia onions were $.99 per pound. Irish potatoes sold at $1.49 for a five-pound bag. Cucumbers were three for a dollar.

Then I visited several roadside markets and found that grapes were priced at $.69 per pound; tomatoes sold for $.59 per pound; cucumbers were fifteen cents each; Vidalia onions sold for $.59 per pound. I could buy a 50-pound bag of Irish potatoes for $4.50. Other products were similarly cheaper.

It does not take a mathematical genius to realize that you can save quite a bundle on your grocery bill by shopping at the roadside markets. And chances are that the food will be fresher and the quality will be greater.

Those who are familiar with gardening realize that the best tomatoes are

those that ripen naturally on the vine. The roadside marketer can pick his tomatoes early in the morning and have them on sale by nine o'clock that same morning. The supermarket staff will receive tomatoes that are picked green and are then shipped across country while the tomatoes ripen under unnatural and often damaging circumstances.

The roadside marketer often grows his own produce and knows what types of chemicals were put on it. He sells to his neighbors as often as he sells to strangers, and he knows he must answer to friends if there is a problem. So he is likely to be more careful with the growing processes and with the harvested produce.

But can the little man actually make any money at the small roadside markets? Fitzhugh McMurry opened his produce stand one year ago in a tiny town in North Carolina. He chose not to build his own stand but to rent a vacant service station building for his market.

So he had to pay to renovate the building and then he must pay rent monthly on the property. How, then, can he realize a profit.

He does it in three ways: by volume selling, by offering the best produce he can supply at the best prices, and by growing as much as he can of the produce he sells.

Stock other items that bring customers in

"The trick is to stock the items customers want," McMurry said. "That often means carrying inventory of items that bring little or no profit. I stock milk, break, and soft drinks only because my customers want these items in addition to the fruits and vegetables they buy from me."

McMurry added, "I make about three cents profit on each loaf of bread I sell. Milk has a three-cent profit per gallon. I get six cents from each soft drink customers buy. If you think about it, you can see I don't realize a profit at all from these items, not after I pay for refrigeration and other expenses. So why do I carry the items? Because my customers stop by on the way home from work, for example, and they buy vegetables and fruit and other foods, and they don't want to stop again to pick up milk and bread and drinks on the way home."

McMurry is right on target. If he has one hundred customers in a day's time and if every customer buys a soft drink, a gallon of milk, and a loaf of bread, it sounds impressive to say that he had sold a hundred of each item.

But figure it out. That's $6 from soft drinks, $3 from milk, and $3 from bread: a grand total of $12 from one hundred buyers.

If, on the other hand, these same customers buy tomatoes, a quart of molasses, string beans, a cantaloupe, and other garden items, then the profits start to add up.

Last summer McMurry sold 3,000 cantaloupes. Assume that the typical cost of each cantaloupe was about fifty cents and the retail price of the melons was $1.49. If this is the case, he paid out $1,500 for the melons and took in $4,470. That would be a profit of almost $3,000 on one item alone.

If he sold 3,000 gallons of milk, his profit before the cost of refrigeration would have been $90.

McMurry also sold 1,000 bushels of apples, more than 50 bushels of string beans, 1,000 watermelons, and countless amounts of peaches, strawberries, corn, squash, cucumbers, and other popular vegetables.

Keep in mind that McMurry's produce stand is located in a town of about 200 people and that he has been in business for only a year. In a larger community and with a longer history of operation, he would improve his number of customers steadily. At the present time, he averages 50 customers per day. Within a year he will raise that average by more than 50 per cent, because his business is local at the present time. When customers who are on the road much of the time realize that he is open, they will start to make his market their stopping point on their way home.

McMurry grows much of his produce and buys the remainder from fellow farmers in the area. He makes his own molasses from cane he also grows. Last fall he sold 1,000 quarts of molasses at $6 per quart—an income of $6,000 on the single item.

Naturally, it costs to grow the crops, but it would still cost him as much to grow the crops if he sold his produce to the supermarkets, and his income would be much smaller.

Like many of the other roadside marketers, McMurry has found a modest gold mine in bedding plants and decorative plants like ferns. He says that the profit margin on bedding plants is the greatest of any product he offers for sale.

Be just a middle man

Another marketer a few miles away is Bob Mosteller, who, unlike McMurry, does not grow much of his own produce. Instead, he buys from local farmers and drives 150 miles to Columbia, South Carolina, weekly to purchase the items he cannot buy locally. Mosteller's prices, even though he has greater costs to absorb than many roadside markets, remain astonishingly lower than those found in supermarkets.

"It's a simple matter," he said. "I own my market property and pay no rent. My only expenses are heat in winter, cooling in summer, refrigeration for perishable items, vendor's license, and salary to some of the part-time people I hire."

Like McMurry, Mosteller does a volume business. He sells bananas regularly for $.25 per pound, and his price for apples and oranges is sometimes about half that found in larger markets in the area.

If you should decide to open your own roadside market, you would find that you could buy all of the produce you want from local growers. Most

small farmers and gardeners are looking for a market for their crops, and they will welcome the opportunity to sell you whatever is in season.

Keep your commitments

Many farmers like a commitment, however: if they agree to provide you with squash, string beans, cucumbers, and other fresh vegetables, they will expect you to continue buying from them. As an example, if you suddenly find a farmer who has planted all his available fields in okra and has so much that he is virtually willing to give it away, and you buy twenty bushels from him for $5 per bushel, and then the man you normally buy from is left with his own okra and no market for it, the second man will not be quite as willing to work with you in the future. Then, when the cheap okra is gone, so is your supplier.

In other words, if a farmer agrees to supply you with his produce at a good price, you should continue to buy from him even if you could save a dollar or two by buying elsewhere. The man who grows the crops will plant each year with a basic market in mind, and if he is left with unsold crops, he will need to modify his planting or marketing strategies, and you may not be among the markets for the next season.

While it is impossible to state an exact profit on each of the various crops that you want to sell, here is a rough idea of profit margin on several items: tomatoes, $.25 per pound; blackberries, $1.50 per gallon; watermelons, $.75 each; apples, $2.50 per bushel; peaches; $7 per bushel; scuppernongs, $1 per quart; Irish potatoes, $3 per bushel; cucumbers, $10 per bushel; squash (yellow crookneck), $8 per bushel; okra, $10 per bushel; string beans, $10 per bushel; cabbage, $5 per 50-pound sack; pumpkins, $1 each.

These figures are based on what it costs to buy vegetables and fruits in my part of the country and what the customer is ready and willing to pay. But there are several other important considerations.

For instance, you want the customer to buy all or nearly all of his fresh produce from you, so if you need to drop the price on a certain item because the man down the road is under-selling you, do so. A fifty-cent profit is better than no profit and a lot better than rotted vegetables you must discard.

A second caution is that fresh produce does not have a long shelf life, so when you see the first hints that the produce is at its peak ripeness, drop the price and move it out.

Third, if there is a glutted market, you must adjust your prices downward, just as you may have to raise prices if there is a shortage of a crop.

Fourth, make regular visits to the supermarkets, or have someone make the visits for you. Be certain that you under-sell the big stores significantly. People will not wait until they are at your produce stand to buy their fruits and vegetables if they can save only a few cents.

Fifth, don't quarrel with customers who tell you that they can buy the same merchandise cheaper down the road. The instant temptation is to tell the customer that he should by all means buy from the other man, but you come out better with a gentle answer to the effect that if you are to continue to stock top-level produce, you must buy only the best and therefore sell it for slightly more.

Or try using the old sign: We have no quarrel with our competitors who sell cheaper than we do; after all, they know what their produce is worth.

If a customer wants to buy bulk quantities, by all means drop the price and sell him an entire sack or box or crate. If you have paid $15 for a bushel of winter squash and someone wants to buy the whole bushel, sell it to him for $22.50. An instant profit of $7.50 is not bad, and if the customer thinks he gets a great bargain by bulk buying, let him continue. It's often better to do volume business than to sell by the pound.

Sixth, keep your place of operation neat and clean. Don't let decaying fruit attract stinging insects and bugs and mice. Keep a screen covering over perishable produce. The customer does not want to buy something that is covered with gnats and flies.

Seventh, if the customer wants to sample a peach, by all means let him. In fact, offer it to him. Don't make him ask.

Eighth, if you have stock that is starting to over-ripen, give it to customers who make large purchases. It's better to donate a small amount of beans or tomatoes than it is to let them rot.

Ninth, offer and maintain a cheerful refund policy. If a customer complains that the melons were no good, replace them or refund his money—until he starts to make it obvious that he is taking advantage of you.

Tenth, Be friendly, courteous, and hospitable, but do not encourage loitering. Many potential customers are turned off by a gang of men sitting around and spitting tobacco juice into their plastic cups.

Finally, three observations: go ahead and buy your privilege or sales license on the basis that it costs very little and it is far better to pay it than to be hauled into court, and don't become discouraged if profits are not great as soon as you open. It takes a while for steady customers to locate your operation. Give them time.

The privilege or sales license in our area is $100 per year, and while this may sound like a lot, it amounts to little more than a quarter per day.

And use part-time help. It is better to be open longer and therefore sell more than it is to lose customers who stopped by after you had closed. Part-time help will enable you to have time off. But hire people you can trust.

Dedicate yourself. Andrew Carnegie once said, "*Do* put all your eggs in one basket. Then watch that basket!" Δ

A canoe livery — an honest, clean business

By Harry Spetla

A canoe and kayak livery business is inexpensive to start and it's easy to operate. The business fits in well with country living since it can be as demanding as you wish it to be. For those of us in the northern climes, it is a seasonal business, so gives you plenty of time to do other things during the off season. The business can be part-time, or it can be full time during the peak season of operation, depending upon your desires and needs.

The canoe livery business is also a great way to meet interesting folks. I have met visitors from foreign lands, and folks from the other side of the country. It's a great time to meet people, because most of your customers are there for recreational reasons, which means they are relaxed, and they are ready to learn new things. Another interesting facet of the business, is that most of the folks whom you meet are interested and active in the outdoors. Every canoe livery operator that I know has a deep and abiding respect for the environment. Many livery operators sponsor river clean ups and perform many other environmentally beneficial activities.

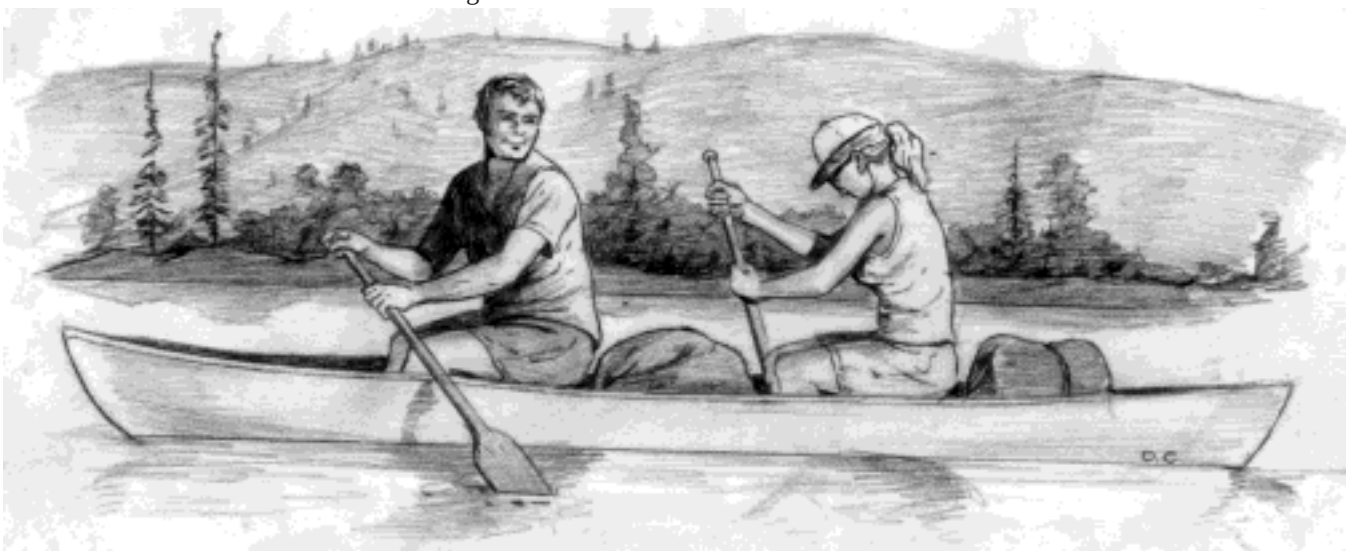
It doesn't take a whole lot to start the business, but there are a few things that you do need to be successful. The first requirement for the business is a close proximity to water. Most liveries have property adjacent to a body of water, though this is not an absolute requirement. In fact, my own business is not located directly on the water. The type of water that your business is located on is important. I would not advise anyone starting out fresh to rent canoes on whitewater. A stream or river with moving water is typically a good rental location, but one should also consider larger bodies of water like lakes that are located in popular tourist areas. A typical livery business will be on a small river with just enough current that the canoes will move along without having to paddle a lot.

The average canoe trip should take about 3-6 hours at a leisurely pace. The boats and customers are then picked up at the end of the trip, and brought back to their starting point. The take out, and put-in locations can be owned by you, but there are other alternatives. Sometimes you can start and end the canoe trip on public lands, owned by a county, state, or federal government.

The requirements for operating on public lands vary. Some governmental agencies require permits, insurance, and they charge a concession fee. Other governmental agencies just accept this as part of normal land usage and they don't have any requirements or charges. It's best to make some inquiries with the appropriate government agencies while your business is still in the planning stages. Another alternative to owning waterfront property is an easement. You can obtain an easement from private landowners in order to get the required access to bodies of water. A private landowner will usually grant you an easement for a nominal fee. I would strongly advise you to contact an attorney in any case where you do not actually own the land that you'll be using.

Canoes and kayaks

The other main ingredient for a successful canoe livery business is a quantity of canoes and/or kayaks. Obtaining canoes and kayaks for your business can be an interesting experience. One way is to simply advertise for used canoes and kayaks in your local newspaper or pennysaver. Using



this method means that you will probably end up with a hodgepodge of boats in your rental fleet. Your customer simply wants a boat that is safe and one that will get him or her where they want to go, so in many cases it doesn't matter what kind of canoe you are renting, as long as it's safe. This is probably the least expensive way to get into the business. Examine your potential purchase carefully. Will the boat be easy to repair if it becomes damaged? Does it currently require repairs? Is it safe?

I try to make sure that all the boats I have in my fleet are inherently stable. Customers are usually not too happy if they go for an unscheduled swim, or if it takes considerable effort to keep the boat upright. Remember you are looking at the watercraft from a livery owners perspective.

The other way to obtain watercraft is to purchase them from manufacturers. Most manufacturers have a purchase program for liveries. These programs usually require you to purchase a certain number of boats, which can add up very quickly. Think carefully before you purchase a lot of boats.

How many boats do you need to start your business? For a part-time business you can easily get by with 3-4 boats, in fact during my first year of operation I started with just 4 boats. I'm currently renting around 40 boats, and I know livery operators who have over 1200 boats to rent. You can grow as necessary. One of the benefits of purchasing a quantity of boats from a manufacturer is that they will probably have the same style, giving your fleet a professional appearance.

What type of canoe should you buy, aluminum, plastic, or fiberglass? I actually own canoes manufactured out of all three types of materials. The aluminum and plastic canoes will last the longest. Yes, canoes do wear out. More and more of the liveries are switching to plastic canoes which are actually constructed out of either polyethylene or royalex. Both materials are very durable. Plastic canoes tends to be quieter in the water than aluminum canoes, and the material doesn't transmit differences in temperature like aluminum. Another important factor regarding plastic boats, is that they don't tend to hang up on rocks like aluminum boats, this is important if your business will be operating on a rocky stream or river. Choose boats that will take the punishment of frequent use. Look at the seats to ensure that they are well constructed, and that they are also comfortable. At the end of the article there is a list of some companies that offer livery purchase programs. I would strongly suggest that you shop around, as boat prices do vary widely.

When starting small you don't even need a canoe trailer to haul boats. During the first few years of our operation, we used a pickup truck to haul both boats and customers. Later as your business grows you can make or purchase trailers for moving canoes.

The daily operation of a canoe business is relatively easy. Let's look at a typical scenario...A customer stops in to rent a boat. You should first gauge his experience level. Will the trip be too strenuous for him or her? If so, make an alternative recommendation, such as a shorter trip. Next give them a briefing about how to safely paddle, and what to expect on their trip. At this point we distribute their personal flotation devices—or life jackets as they were once called. In the interest of safety we require all renters to wear their personal flotation devices. It makes me sleep better at night.

We also distribute paddles at this time and give the folks a chance to try paddling techniques on land before they get into that moving boat. Customers then complete two important documents, a rental agreement and a waiver of liability. The rental agreement simply outlines what the renter is renting, how much they are paying for the rental equipment, and it also outlines what happens if the renter brings back the equipment in a damaged condition. The liability waiver is signed by all members of the rental party. This hopefully provides you with some protection in the event that something unfortunate occurs. These forms can be drawn up by your attorney or your insurance company.

Liability insurance

This is a good time to discuss on-water liability insurance. Many canoe liveries do not carry any liability insurance for on-water activities. This is a decision that you need to make. There are many factors to consider such as the type of water you are renting on and how much you have to lose if a lawsuit does occur. It is best, again, to consult with your attorney and your insurance agent. Unfortunately, many of the local agents are not knowledgeable about the paddlesports industry, so I have provided a list at the end of the article of companies that I do know take an active role in the industry. I do not endorse any of them, they are simply there for reference purposes.

Going back to our original rental scenario...our renter has completed the necessary paperwork. At this point we collect the rental fee and security deposit. Now the customer is ready to go. I usually try to provide a map of the trip, just as an additional way of ensuring for the comfort of my guest. The renter is provided with a boat, and arrangements are made to pick the party up within a specific time period. Since my business is not on the water, we provide our customers with foam blocks and ropes that permit them to transport the boats wherever they desire. Please note that we do obtain a security deposit and drivers license information prior to letting them drive off. Actual damage to our equipment has been a pretty rare occurrence.

Later in the day we go to the pick-up area to retrieve the boat and to transport the customers. In some cases the customers bring the boats back themselves using the foam blocks and rope we have provided. We make sure that

the customers have had a good time, because if they have, then more than likely they will be back. After examining the condition of the equipment we refund their security deposit. The equipment is then cleaned and prepared for the next rental customer.

The going rate for canoe rentals varies across the country from around $15 to $55 per day. The differences can be attributed to the material that the boat is constructed of. We rent canoes made of cedar strip and carbon fiber. These boats can weigh from 30 pounds up, and they can cost several thousand dollars. It takes quite a while to recoup your investment when the boat is expensive. Aluminum and plastic boats cost much less and they can actually last decades depending upon the use. Many livery operators sell off a portion of their fleet at the end of the season and keep rotating their rental boats by buying a quantity of new boats at the beginning of the season. These culled watercraft are quite serviceable and they can provide you with another means of obtaining boats. Depending upon the size of your operation, you can reasonably expect to make from $2000 to $40,000 depending upon your location and the number of boats that you rent.

Advertising

Advertising your canoe livery business can be a challenge, just like any business. We try to advertise in recreational oriented media, such as outdoor magazines, at sports shows, and in tourism booths. Don't overlook your local chamber of commerce. For my business, one of the best non-traditional marketing means has been the internet, and we have been quite successful teaming up with local motels in promoting mini vacation packages. If you're located near a major population center it's best to advertise there. I live in a very remote area, and my average customer is located from 200-500 miles away, and we have had a number of international visitors too.

You will need to try different media to see which works best for you. I know some livery operators who swear by newspaper and radio ads, but neither has worked well in my area. From personal experience and from conversing with other livery operators, national magazine advertising, though expensive, is very effective. Again, it depends upon the market you are trying to reach.

A good resource for anyone starting a canoe livery business is the Professional Paddlesports Association, which is dedicated to supporting paddlesports businesses. They can help you organize your business and make it more professional. Another good resource is the American Canoe Association which can also help you become a better trained paddler if you aren't already active in paddlesports. Membership in both organizations is money well spent. Their addresses are listed at the end of this article.

If you are located near a body of water, and you enjoy meeting new folks and you like the outdoors think about starting your own rewarding canoe livery business. I can honestly say that I don't have any regrets after working in the outdoor business over ten years...try it, I think you'll like it!

Paddlesports organizations

Professional Paddlesports Assn.
P.O. Box 248
Butler, KY. 41006
606-472-2205

American Canoe Association
7432 Alban Station Blvd., B-226
Springfield, VA 22150-2311
703-451-0141

Canoe and kayak manufacturers

Old Town Canoe Company
58 Middle Street
Old Town, ME 04468
207-827-5514

Buffalo Canoes
P.O. Box 60
Jasper, AR 72641
800-477-8509

ClearWater Design
1978 Bur Brook Road
Kingston, Ontario, Canada
K7L4V4 613-546-2444

Great Canadian Canoe Company
64 Worcester Providence Turnpike
Sutton, MA 01590
508-865-0010

Kiwi Kayak
P.O. Box 1140
Windsor, CA 95492
800-545-2925

Mad River Canoes
Box 610
Waitsfield, VT 05673
802-496-3127

Osagian Canoes
27067 Highway 5
Lebanon, MO 65536
417-532-7288

Marathon Canoes
P.O. Box 549
Marathon, N.Y. 13803
607-849-3211

On-water liability insurance companies

Allied Specialty Insurance
10451 Gulf Boulevard
Treasure Island, FL 33706
800-237-3355

BGS&G
P.O. Box 2005
Uniontown, PA 15401
412-437-7503

C&G Midwest Insurance Agency
1 Stephendale Court
Rolla, MO 65401
314-364-0400

K&K Insurance Group
P.O. Box 2338
Fort Wayne, IN 46801
219-459-5000 Δ

Get the taste of India in your kitchen tonight

By Richard Blunt

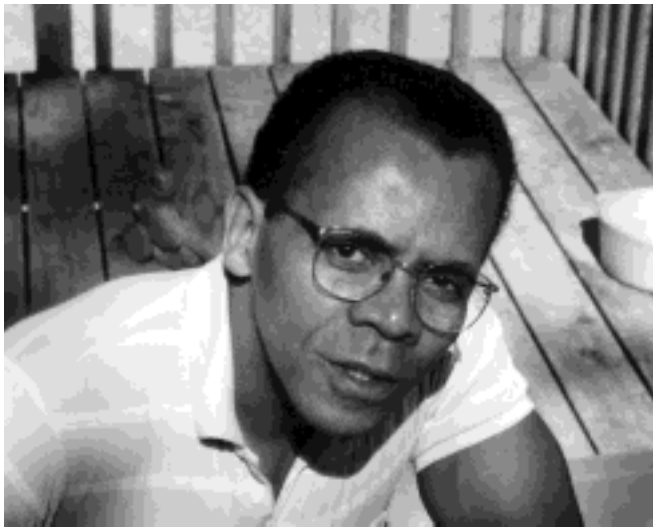
Over the centuries India has been invaded by one foreign culture after another. Each invader brought with it new genetic traits, cultural ideas, religious concepts, and culinary techniques that were added to India's long established but fragmented social structure. Those new influences had profound effects on the lives of India's people, but of particular interest to us are the effects it had on the foods that Indians eat today and the methods used to prepare those foods. It is simply amazing how India's people successfully assimilated the culinary influences of one invader after another and from them developed a classic cuisine they can now call their own.

For many years most of the significant foreign culinary influences were concentrated in the north. In the 16th century Turkish invaders, called Moguls, introduced to northern India highly refined and sophisticated culinary concepts they acquired while traveling through Persia on their way to India. Today this Mogul food, with its delicate flavorings and silky sauces, is the standard fare served in fine Indian restaurants around the world.

However, in the centuries before any of these invaders arrived in India, many distinctive cooking styles had already developed in the country. But because of natural barriers and poor transportation systems, the individual regions rarely influenced each other and as a result cooking styles throughout the country evolved independently, each with its distinctly regional characteristics. Most of these regional styles still flourish today but when all considered together they form the body of classic Indian food—the most subtle, diverse, and flavorful of the Far Eastern cuisines.

Indian cooking is the most straightforward and easiest of all international cuisines to master. It uses many cooking techniques, utensils, herbs, and spices that are familiar and readily available to most American cooks. Although there are a few spices and spice mixtures unique to Far Eastern cooking, even these are available for purchase in the many Indian and Asian grocery stores located throughout the United States and Canada. And most of the Indian and Asian stores accept mail orders and will sell you herbs and spices at a fraction of the average supermarket price.

The skills required to successfully prepare Indian food are basic but extremely important. First, you must have an understanding of your own taste preferences and prejudices. Second, you must have a working knowledge of how to use spices and herbs. I can't help you with the first, but I can contribute important information about some of the special herbs and spices most frequently used in Indian cooking. I feel this information will help you approach Indian cooking with confidence. Once you have that confidence, the whole experience will be like your first trip to Disney World where there is fun and excitement around every corner.



Richard Blunt

Herbs and spices perform various roles in Indian cooking. Some herbs and spices are used as aromatics, some add a flavor enhancing hotness to foods, while others function as souring, thickening, or coloring agents. It is not uncommon for a spice to perform multiple functions. Hindu scriptures even provide a list of herbs and spices with powers to treat and cure common physical ailments like flatulence, colic, bad breath, and nausea.

In the recipe section I have included recipes that use the most important herbs, spices, and spice mixtures used in everyday Indian cooking. The following is a list of specialty flavorings, along with brief descriptions of how to identify and use them. Due to space limitations, the list is not complete. It does, however, contain enough to give you a basic knowledge of how to identify and work with flavorings most frequently used in Indian cooking. I have not covered more familiar seasonings like paprika, stick cinnamon, cayenne pepper, kosher salt, black pepper, ginger, garlic, clove, and onion because I feel they require little explanation to the majority of cooks. On the other hand, information about unique Indian seasonings, such as asafetida, carom, fennel, mango powder, pomegranate seed and juice, saffron, onion seed, and kari leaves, have no application in the recipes that I have selected, so we will save those for another column.

Herbs and spices

As the popularity of Indian food continues to rise in this country, many of the following Indian herbs and spices are becoming available in supermarkets. I will indicate those that I have only been able to find at Indian and other specialty stores. In this list, I follow the English name with the Indian name and pronunciation in parenthesis.

Bay Leaf (Tej Patta, TAYJ PAH-tah): There are two types of bay leaf available for use in Indian cooking. The one that most of us are familiar with is sweet bay laurel which is the leaf of the bay tree (*laurus nobilis*). The type used in Indian cooking is the leaf of the cassia tree (*cinnamomun cassia*). At a glance both leaves look alike, but a closer examination will reveal some distinct differences. Bay laurel is a thick, shiny, fresh looking, dark green leaf that has a bitter taste and a pungent aroma. Cassia leaf, or Indian bay leaf, is a light dull green and has a mellow sweet taste and a spicy aroma. Indian bay leaves also break very easily, unlike bay laurel which is quite pliable. The characteristics of Indian bay leaf make it more suitable for Indian cooking but bay laurel may be used as a substitute.

Indian bay leaf is usually packed in plastic, zip-lock bags in Indian and Asian markets and sell at a fraction of the cost of bay laurel.

Cardamom (Elaichi, ee-LIE-a-chee): The cardamom plant is native to South India. Its fragrant seeds are one of the essential spices in Indian cooking. It is available in whole pod, loose seed, and powdered form. The whole pods can be purchased in Indian markets in two varieties: green or choti black (small) and black or badi (large). The black variety has a mellow taste and a nutty aroma and is available only in whole pods. The green variety can be purchased in all three forms. It has a powerful aroma but a sweet and delicate taste. Removing the seeds from cardamom pods is a laborious and time consuming exercise. In spite of this, I use the whole pods exclusively because they are usually fresher than the loose seeds and powder. Many recipes call for cardamom in whole pod form and I keep both varieties of the pods in stock. For recipes calling for seeds or powder I wait until my children are in bed, load the boom box with Dick Clark golden oldies, and start cracking pods. Six black pods or twenty-five green pods will yield about a teaspoon seeds. If you need a lot of seeds, rent a Clint Eastwood movie.

Coriander Seed (Sookha Dhania, SOO-kah TAH-nee-yah): Coriander seed is another essential spice in Indian cooking. It has a strong nutty aroma and sweetish taste. In its powdered form it acts as a thickener for sauces and gravies, as well as a flavor enhancer. The seeds have a longer shelf life than the processed powder, as well as a finer flavor when roasted and ground fresh.

Cumin (Jeera, JEE-rah): Cumin is not just important, it is essential to Indian cooking. Few, if any, meals are complete without its use in one form or another. There are two main varieties of cumin seed used in Indian cooking: white cumin (*cuminum cyminum*) and black cumin (*cuminum nigrum*). White cumin is pale brown in color, about the same size as caraway seed, and has a strong nut like flavor. It is available at most food stores in whole seed and powder. It also requires roasting before it will release its full taste and aroma. Black cumin is darker and smaller than the white variety and has a sweeter aroma and a more delicate taste. It is one of those rare spices that, as far as I know, is only available in whole seed form at Indian markets or other specialty food stores. Black cumin, because of its mellow taste, does not require roasting before it is used. It is a regular ingredient in many classic Northern Mogul dishes.

Black Mustard Seed (Rai, RAH-ee): This pungent smelling spice, with its sharp eye opening taste, is an essential ingredient in southern and southwestern Indian dishes. When roasted and ground it adds a sourish bitter taste to food. When treated with proper respect black mustard seed will add a special flavor to hot and spicy dishes that cannot be achieved with any other ingredient.

Tamarind (Imli, IM-lee): The tamarind tree grows in India's tropical regions and produces a long brown bean pod. The seeds inside the pod are encased in a brown, tart tasting pulp. When the bean matures it is picked, peeled, and partially pitted. The pulp is then compressed into cakes. A sour juice is extracted from this pulp and is used in many Indian recipes. It is also used in Worcestershire sauce to give it its classic flavor. Tamarind is sold in Indian markets in both cake and juice form. In my opinion, only the pulp form is suitable for Indian cooking because the juice is very salty, far too acidic, and very short on flavor.

Turmeric (Haldi, HAL-dee): Turmeric is used primarily as a coloring agent throughout India, except in the Northwestern regions, where saffron is used. The delicate flavor of turmeric gets lost when it is used with cream sauces, but it blends perfectly with onion and tomato based sauces.

White Poppy Seed (Khas-khas, Kas-Kas): The white poppy seed is a close, non-opium producing cousin to the familiar black poppy seed that is often used on bread and rolls. It is off-white in color, flavorless, and odorless in its raw form. After roasting and grinding, it is used in northern meat and seafood dishes as both a thickener and flavor enhancer. They are available whole in Indian grocery stores.

Green Chilli (Hari Mirch, HA-ree MEERCH): Green chilli is the young pod of the well known capsicum pepper plant. Indian, Asian, Spanish, and Mexican markets sell several varieties of fresh, hot, green chilli peppers. They range in size from less than ½ inch to about 3 inches in length. Don't let the green unripe appearance of these peppers fool you, they are all hot. The smaller the pepper, the more ferocious it will be. Indian cooks do not traditionally use fresh chillies when they mature to their yellow and red

stages. In the southern regions, however, they use large quantities of unseeded, dried red chillies in some spice mixtures and recipes designed to be very spicy and hot.

Cooking oils and fats

Until recently two basic fats were used in Indian cooking: ulsi ghee (pure butter fat) and vanaspati ghee (vegetable fat). There are also several different vegetable oils used. The most popular are corn, sunflower, peanut, coconut, sesame, and mustard oil. Ulsi ghee is simply clarified dairy butter. Vanaspati ghee is a vegetable shortening produced from highly saturated oils such as coconut, rapeseed, and palm and is processed to look, smell, and taste like ulsi ghee. The growing awareness of potential health problems caused by the consumption of saturated animal and vegetable fats has given rise to the more frequent use of light unsaturated oils in Indian cooking. There are, however, some recipes that require a specific type of saturated fat as a flavor enhancer as well as a cooking medium. If an unsaturated fat is substituted, the recipe usually looses taste and character. The recipes included here are exceptions and can use the unsaturated fats.

I use peanut or soybean oil as all purpose cooking fats in my kitchen. They both have a mellow taste that does not overwhelm the subtle flavors of herbs and spices, and they're easy to digest. I don't use olive oil in Indian cooking because most of the recipes that I have read do not call for it.

Before we move on to the recipes, a word of advice. With few exceptions, all spices used in Indian cooking must be cooked before becoming part of the finished dish. When preparing Indian food, regard all spices as vegetables to be cooked before being eaten. Doing so will prevent digestion problems, and allow the spices to release their maximum flavor.

Let's move on to the recipes, and have some fun.

Vendaloo — Goanese hot curry

This fiery-hot, mustard-laced dish, accented with a variety of aromatic spices, will satisfy all of those wonderful fantasies that you may have about Indian food. It is hot, without being mouth numbing, and flavorful with a flowery essence enhanced by the fiery taste of chilli pepper. Vendaloo truly demonstrates the versatility of Indian cooking by giving a cook the option to incorporate a wide variety of ingredients without compromising the character of the dish.

Vendaloo is traditionally made with pork, a meat rarely eaten in India, except by the Christian minority in the former Portuguese colony of Goa. The combination of Indian and Christian cultures has given rise to many interesting variations of this recipe. Chicken, lamb, beef, and even duck have been incorporated with excellent results. If you are fortunate enough to have a couple pounds of prime, tender venison in the freezer, and you're looking for an exciting taste treat, substitute it for the pork. You will find it well worth the effort.

This recipe specifies pure mustard oil as an optional ingredient. Pure mustard oil has the reputation, in America, for being overly pungent and not well suited for cooking. You can substitute any light vegetable oil and achieve good results, but that authentic vendaloo flavor will be noticeably missing. Indian cooks have a simple technique that mellows mustard oil and converts its pungency into a smooth, pleasant flavor that truly enhances the integrity of any recipe calling for its use. The mixture of spices and herbs used in the marinade are a custom blend called vendaloo masala. This blend, like many other specialty spice blends, can be purchased at most Indian food stores in prepackaged form.

The taste of the prepackaged masala blends, however, does not equal that of the homemade versions and they leave you little or no room to add your own "hath ki bat" (personal touch). I strongly recommend you expend the extra effort and roast and grind your own whole spices. The experience will fine tune your palate and allow you to objectively evaluate the quality of any packaged spice blend or ground spice.

Vendaloo is traditionally served with rice, but noodles and fresh baked whole grain breads are also excellent complements.

Ingredients:

2 lbs. boneless pork loin (trimmed of all visible fat and cut into one inch cubes)

Marinade ingredients:

4 green cardamom pods
1½ tsp. cumin seeds
½ tsp. whole black peppercorns
1 tsp. black mustard seeds
1 medium onion, diced
1½ Tbsp. fresh ginger, diced
4 cloves fresh garlic, diced
2 Tbsp. malt vinegar
2 Tbsp peanut oil
½ tsp. ground cinnamon
¼ tsp. ground clove

Marinading procedure:

1. Heat a small, heavy-bottomed skillet over a medium flame, add the cardamom pods, cumin seeds, peppercorns, and black mustard seeds. Roast the spices, stirring constantly, until the mustard seeds turn gray (about four minutes). Transfer the roasted spices to a heat-resistant dish and let

them cool for a few minutes, then grind them to a fine powder in a blender or spice mill.

2. Combine the onion, ginger, garlic, malt vinegar and oil in a blender. Process them into a fine, pasty puree. Combine this puree with the roasted spices, cinnamon, and clove. This marinade should resemble a thick paste.

3. Place the pork in a stainless steel bowl or other non-reactive container (glass or plastic). Add the marinade to the pork. Carefully rub each piece of meat with the marinade. Cover the container and marinate the pork, under refrigeration, for 12 to 24 hours.

Cooking ingredients:

1 ounce tamarind pulp
1 1/3 cups chicken stock
¾ tsp. kosher salt
1/3 cup pure mustard oil (this oil is optional, peanut oil may be substituted)
2 cups onion (thinly sliced)
1½ tsp. turmeric
½ to 1½ tsp. cayenne pepper, **use caution** when adding this ingredient.
1½ tsp. paprika

Method:

1. Bring the chicken stock to a boil. Place the tamarind pulp into a bowl and add the boiling stock. Let the mixture soak for 15 to 20 minutes. Strain the liquid through a strong metal sieve, then squeeze the pulp to remove as much liquid as possible. Set the liquid aside and discard the remaining pulp.

2. Remove the meat from the refrigerator, and rub as much excess marinade from meat as possible. Add the excess marinade to the tamarind water along with the salt.

3. In a large heavy bottom skillet or Dutch oven, heat the mustard oil until it begins to smoke then remove the pan from the heat and let the mustard oil cool. If you are using peanut omit this step.

4. Heat the conditioned mustard oil (or other oil, if you substituted) over medium heat and add the onions. Fry them until they turn a caramel brown. Stir them frequently to prevent sticking and burning. If onions begin to stick, add a couple of tablespoons of water to the pan.

5. Increase the heat to medium-high and add the turmeric, red pepper, and paprika to the browned onions, stirring constantly for about 15 seconds. Add the meat and fry it until it loses its pink surface color and starts to brown on all sides.

6. Add the tamarind mixture to the meat and bring it to a boil. Lower the heat, loosely fit the cover on the pan, and simmer slowly for about 30 minutes or until the meat is completely cooked and tender.

7. Adjust salt to your taste.

8. Let the vendaloo rest, covered, in a warm oven for one hour before serving.

Basic boiled rice

Rice has been cultivated in India for about six thousand years. It is a staple food for two thirds of the country's population. In the southern and eastern regions, where rice is grown abundantly, it is usually served plain. Indian cooks pamper rice with meticulous care by custom cooking it in one of three ways: steaming, boiling, or baking. When not served plain, their refined cooking techniques produce rice side dishes so elaborate that they often overshadow the main dish. In the recipe section, I will share with you my version of an elegant baked rice pilaf. But first, let's explore the two most important elements of an Indian rice pilaf—the rice and the seasoning.

Basmati, a variety of aromatic long grain rice grown along the foothills of the Himalayas, is considered by food experts to be the best rice in the world. When cooked properly it develops long thin grains that are tender to the touch while exuding a wonderful nutty aroma. The best quality basmati that I have used is called Dehradun basmati; it is clean, contains few broken grains, and is carefully aged for several years to enhance its flavor and aroma.

Basmati rice does not require special skills or equipment to be prepared properly, but some special cooking requirements are recommended. It is also easy to find, because it is available at most super markets in standard retail packages. Make sure the label reads "Basmati Rice"; rices labeled "Texmati" and "Jasmati" are close but not the same. Follow the procedure outlined below and you will never have a problem cooking basmati rice.

Ingredients:

1 cup Indian basmati rice
cold water for cleaning and soaking the rice
2 cups cold water for cooking the rice
½ tsp. kosher salt

Method:

1. Spread the rice on a baking sheet or large platter; pick out any pieces of stone, dirt or unhulled grains.

2. Place the rice in a large bowl, fill the bowl with cold water. Any light foreign matter will float to the top, and can be scooped away. Rub the rice between your fingers to remove any surface starch. The water will become slightly milky. Repeat this procedure, with fresh water until the water remains clear. Soak the rice in this clear cold water for at least 20 minutes.

3. Drain the rice in a colander, and let it air dry for 10 minutes.

4. Combine the rice, 2 cups of fresh cold water, and the salt in a heavy-bottom pot. Bring the water to a boil, reduce the heat to a point where the water is at a slow simmer. Partially cover the pot and cook the rice for **exactly** 12 minutes.

5. Remove the pot from the heat, cover the pot completely, and let the rice develop for another twelve minutes. Remove the lid and gently fluff the rice with a fork.

Garam masala

Masalas are artfully constructed blends of aromatic spices. Some of these blends are generously enhanced with hot and pungent spices. The following recipe is a personalized version of the masala blend that has become the hallmark of classic northern Indian cooking. Its captivating aroma and intriguing flavor will speak for itself in the pilaf recipe that follows.

Masala blends were introduced to Northern India by the conquering Turkish Mogul emperors during the 16th century. The traditional garam masala contains only four aromatic spices: cardamom, cinnamon, cloves, and black pepper. Over the centuries various quantities of cumin and coriander have been added changing the subtle character of the original blend to one that is more pronounced and spicy. The traditional blend is now called mughal garam masala, and is used in some of the most elaborate and classic mogul dishes of Northern India.

The spicier blend, simply referred to as "garam masala" or "punjabi garam masala," is more widely used in the north, and numerous counterparts of this blend are used throughout India. I have discovered that masala blends are not restricted to use in Indian cooking. Many familiar soups, stews, vegetables, meats, and sauces take on a new and exciting character with the addition of a little of this magic blend. Many leftover refrigerated and frozen foods tend to lose a great deal of their original flavor during storage. Adding a little garam masala before reheating is the way to bring them back to life.

This recipe makes about 1/2 cup.

Ingredients:

- 1 tsp. cardamom seeds (25 green pods or 6-8 black pods)
- 1 cinnamon stick (about 3 inches long) broken into small pieces
- 1 tsp. whole cloves
- 2 Tbsp. black peppercorns
- 2½ Tbsp. white cumin seeds
- 2 Tbsp. coriander seeds

Method:

1. Heat a heavy-bottom fry pan, preferably cast iron, over a medium heat for about 2 minutes. Roast each spice separately, stirring constantly to prevent burning. For the first couple of minutes nothing will appear to be happening because the spices are loosing their moisture. After this brief period they will start to brown very quickly. If you don't watch them carefully, while stirring constantly, they will burn. Turn down the heat if they seem to be browning too quickly.

2. While the spices are browning, they will give off a little smoke, and release a noticeable fragrance. Roast each spice, except for the black pepper, until they turn a dark brown. Black pepper will show little or no signs of browning, so as soon as it begins to smoke and release a fragrance, consider it done.

3. After roasting, immediately transfer each spice to a dry heat-resistant bowl to cool.

4. Process the roasted spices to a fine powder in a spice grinder, blender, or coffee grinder that has been assigned to the sole task of grinding spices. This is important, because once you grind aromatic spices in a coffee grinder the residue of these spices will add some unpleasant flavors to your coffee.

5. If you seal the masala in an airtight container and store it in a cool, dark place it will stay fresh for up to three months.

Rice and vegetable casserole

The great pilafs of Provence, introduced to the American South by displaced French Huguenots, had their roots in the ancient art of Indian pilaf cookery. Pilafs are prepared throughout India in so many elegant ways that it would take a large book dedicated to this one aspect of Indian cooking to give them proper attention. The recipe that inspired my version of this casserole is one of India's most elegant vegetarian entreés. The original recipe contains a basic Indian cheese used by Buddhist and Hindu Brahmans as a primary source of protein, a slightly different selection of vegetables and a spice selection designed to accent that particular balance of ingredients. Ten years of experimenting with Indian cooking concepts has taught me that Indian cooking is a highly personalized art that easily accommodates the individual tastes of all who practice it. By using proven recipes when you begin preparing Indian food, you will develop a reliable working knowledge of how to use spices and herbs. In a short time you will also acquire a sense of how these herbs and spices behave with other ingredients in a recipe.

This casserole reflects my personal taste. It uses ingredients that my family and I enjoy eating throughout the year. Despite adding my personal stamp on this recipe, I haven't deviated from the classic flavor and texture of this wonderful dish. Please give this recipe a try; I am sure you will agree that the Indian pilaf is as good as rice cookery gets.

I usually serve this casserole as a side dish along with a main entree such as vendaloo. You can turn it into a one dish meal that will feed four adults by simply stir frying 12 to 16 ounces of 1/2-inch diced boneless chicken breast, lamb, or beef, and gently folding it into the casserole after you remove it from the oven. Use only top-quality, tender lamb or beef.

Ingredients:

2 qts. water
1 cup basmati rice, washed, soaked, and air dried as described in the plain rice recipe
1 medium size turnip, about 4 ounces, peeled
2 medium carrots, peeled
1½ cups fresh or frozen butter beans (baby lima beans may be substituted)
3 Tbsp. peanut oil
1½ cups onion, diced fine
2 cloves fresh garlic, chopped fine
1 Tbsp. fresh ginger root, peeled and chopped fine
1 fresh green chilli pepper, seeded and chopped fine (or use ½ tsp. cayenne pepper)
4 green cardamom pods
6 whole cloves
2 tsp. garam masala
3 Tbsp. ground blanched almonds
2/3 cup plain (fat free) yogurt
¾ cup low salt chicken stock (fresh or canned)
4 fresh plum tomatoes (peeled, seeded, and chopped)
1 tsp. Kosher salt

Method:

1. In a suitable size pot bring 2 quarts of water to a boil over medium-high heat. Add the washed and soaked rice, and stir for 30 seconds to prevent the grains from sticking. Boil the rice for exactly two minutes, then drain the rice through a metal colander. Immediately run cold water over the rice to stop the cooking process.

2. Drain the rice and set it aside.

3. Cut the peeled turnip and carrot into uniform 1/4-inch thick 1 inch long pieces; put the pieces in cold water and set them aside. Measure the butter beans, cover them with cold water in a separate bowl and set them aside also.

4. Heat the oil over a medium-high heat in a 5 quart cast iron Dutch oven or other flame-proof pot with a tight fitting lid. Add the onions, reduce the heat to medium, cook the onions, stirring constantly, until they begin to brown. Add the garlic, ginger, fresh green chilli pepper, cardamom pods and whole cloves. If you are using powdered cayenne pepper, do not add it at this time. Continue to cook the mixture for another two minutes.

7. Add the garam masala and ground almonds. If you are using powdered cayenne pepper in place of the chilli, add it now. Continue cooking the mixture for another minute.

8. Add two tablespoons of the yogurt. Cook the mixture until all of the moisture evaporates. Repeat adding yogurt two tablespoons at a time until all the yogurt is incorporated. Stir the mixture constantly during this process to prevent sticking.

9. Drain the turnips, carrots, and butter beans and add them to the mixture along with the chicken stock. Reduce the heat to medium-low and simmer the vegetables, covered, until they are tender but still firm. Remove the cover and cook the vegetables for another 5 minutes, to reduce the liquid and thicken the sauce.

10. Turn off the heat and gently fold the rice, tomatoes and salt into the vegetables.

11. Cover the Dutch oven with a piece of aluminum foil and put the lid firmly in place

12. Bake in a preheated 300 degree oven for 30 minutes. Turn off the heat and let the casserole rest inside the oven for an additional 10 minutes.

Spiced Red Beans

This is a dish that I often serve with a pilaf, plain rice, or fresh baked bread to add substance to a meatless meal. It is easy to prepare and red beans are an excellent source of protein.

Beans of any kind are a touchy issue in my house, so before I could add this recipe to these pages I was obliged to submit a finished sample to the resident food committee for approval. This collective of discriminating, hard-lined food critics is chaired by my daughter Sarah, with her two brothers, Jason and Michael, holding the other two seats. If a recipe doesn't receive a unanimous thumbs up from the committee, it goes to the oval file. I presented it to the committee for the first time six months ago. Since then it has become a favorite side dish and an often requested between-meal snack. The following recipe serves four as a side dish.

Ingredients:

1 cup dried red kidney beans
5 cups cold water to soak beans
3 cardamom pods
1 cinnamon stick, 2 inches long
2 bay leaves
3 Tbsp. peanut oil
1 large onion, thinly sliced
3 cloves fresh garlic, chopped fine
1 Tbsp. fresh ginger root, peeled and chopped fine
½ tsp. ground turmeric
1 tsp. garam masala
¼ to ½ tsp. powdered cayenne pepper
4 fresh plum tomatoes, peeled, seeded and chopped
1 cup low salt chicken stock, fresh or canned
½ tsp. kosher salt

Method:

1. Pick over the beans to remove any foreign matter, or damaged and discolored beans. Soak the beans in 5 cups of cold water for 12 hours or overnight.

2. Drain the soaked beans, discard the soaking water, then rinse the beans under cold running water. Put the beans and

5 cups of fresh water in a pot that will hold everything with room to spare. Bring the beans to a boil over a medium-high heat, reduce the heat and let the beans cook at slow simmer for one hour or until they become tender. Drain the beans and set them aside.

3. Heat a heavy-bottom skillet over a medium heat for one minute, then add the cardamom, cinnamon stick and bay leaf. Roast the spices for one minute being careful not to let them burn.

4. Add the oil and, when the spices start to sizzle, add the onion and cook until the onion starts to brown. Add the garlic and ginger and continue cooking the mixture until the onions turn a medium brown. Add the turmeric, garam masala, and cayenne pepper, and cook for another minute, stirring constantly to prevent burning.

5. Add the chopped tomatoes, chicken stock, salt, and beans. Adjust the heat to the lowest possible point, cover the skillet, and slowly simmer the mixture for about 10 minutes. Let the beans rest after cooking for 10 minutes before serving.

Masala jheenga (JEEN-gah)

This is a spiced shrimp dish. Sauteed onion, roasted white poppy seeds, and aromatic garam masala seasoning are combined with turmeric-laced shrimp stock to add Mogul grandeur to this classic dish, which has its roots in the coastal state of Bengal.

Do not compromise on the quality of the shrimp you purchase for this recipe. Insist on examining the shrimp before you buy. Trust your own judgement; if they smell funny, feel slimy, or even look funny don't ask why, just find another place to buy your seafood.

Ingredients:

1½ tsp. white poppy seeds
2 pounds medium-size raw shrimp (about 30 to 35 shrimp per pound)
½ tsp. turmeric
2½ cups cold water
¼ cup regular or low fat milk
¼ cup cottage cheese
3 Tbsp. peanut oil
2 cups onion, chopped fine
3 cloves fresh garlic, minced
2 tsp. garam masala
1 tsp. paprika
4 fresh plum tomatoes, peeled, seeded, and chopped
¼ to ½ tsp. cayenne pepper
1 tsp. Kosher salt
2 Tbsp. fresh cilantro leaves, chopped

Method:

1. In a small fry pan, dry roast the poppy seeds over medium heat until they turn brown. Let them cool for a few minutes then grind them to a powder in a spice mill or blender.

2. Peel and devein the shrimp, then wash them in cold running water. Put them in a colander and let them drain for 15 minutes.

3. Put the shrimp, turmeric, and cold water in a suitable size pot to poach over a medium flame. Watch the shrimp carefully because they will cook completely before the water boils. Drain the shrimp and **save** the poaching water.

4. Process the milk and cottage cheese in a blender until they are thoroughly blended together with creamy consistency.

5. Heat the oil in a Dutch oven (or other heavy bottom skillet with a non-stick surface) over medium heat. Fry the onions, stirring constantly, until they turn medium brown (about 10 minutes). Add the garlic and cook for another minute.

6. Reduce the heat to low, and stir the ground poppy seeds, garam masala, and paprika into the onion mixture, and cook about 15 seconds.

7. Add the chopped tomato, cayenne pepper, salt, and 1½ cups of the reserved poaching liquid. Increase the heat to medium high and boil the mixture, uncovered for 15 minutes, or until the sauce becomes thick and pulpy. Be sure to stir the sauce every few minutes to prevent sticking.

8. Reduce the heat and add the cottage cheese and milk puree. Cook the mixture over low heat for another two minutes, stirring constantly. Gently stir in the shrimp, cover, and slowly simmer the mixture until the shrimps are heated through. Turn off the heat and let the mixture rest for one hour before serving.

9. At serving time slowly heat the mixture. Sprinkle the cilantro leaves on top as you bring the dish to the table.

I hope that you enjoy this brief visit to the vast world of Indian cooking. Δ

Thunderstorm

Dark, silent house
-LIGHTNING- CRASHING THUNDER, Rain
"Can I sleep with you?"

Ryan Thornsberry
Cape Girardeau, MO

Get paid to take vacations

By Robert L. Williams

Many years ago my wife and I (our son was not yet born) moved to the backwoods life, and we have never wavered toward going back to the rat race. However, there comes a time when it is either necessary or desirable to rejoin the materialistic and commercial world, if only for a few days.

Even staunch backwoods types occasionally want to see some historical site, natural wonder, or educational exhibition—or even a ball game—but we find very quickly that on the rare occasions when we must go back into the traffic and exhaust fumes that prices are astronomical, particularly in areas quaintly known as resort towns.

So we began to look for a way to enjoy occasional vacations without having to spend a small fortune. What we found startled us for several reasons.

One of our working vacations took us to George Washington's Mount Vernon.

A short time ago, for instance, we spent a week in two of the most beautiful cities in this country: Savannah, Georgia, and Charleston, South Carolina. We visited all the best historic and educational sites, and we toured colonial mansions, wonderful gardens, and even swamps.

Three weeks later we made a tour of the most beautiful mountain peaks (and surrounding areas) in South Carolina, North Carolina, Georgia, and Tennessee. We stayed in delightful inns and ate elaborate meals.

And how many credit cards did we have to max out in order to enjoy these vacations?

None. The incredible truth is that we actually earned money while we enjoyed ourselves. To give two examples, on the trip to Charleston I earned (so far!) over $1,500, after expenses. On the mountain trip through four states, I earned more than $2,000, after we had paid for our necessary costs.

Consider that for a moment: a total of more than $3,500 paid to us, and in exchange all we had to do was enjoy fantastic visits to great locations and eat delicious foods in superb restaurants. On a recent trip of three days I earned more money, again after expenses, than I made in a month teaching college classes.

Seeing coastal scenery on salary lights up anyone's life.

Unbelievable? Not at all. I can tell you how we did it, and at the same time I'll tell you how you may be able to do it.

Did you notice the word "may" in the previous sentence? That word is there because not everyone will want to travel the way we did, and, to be blunt, not everyone can handle the work. But, on the safe side, I'd guess that more than eighty per cent of the people reading this article can follow in our footsteps—or to places of your own choosing.

What I did was write articles about the places we visited for newspapers and magazines. Their travel sections and the people who read them are hungry for such informative columns. Here's how we did it, and how you can also do it.

First, I read travel sections of several local newspapers, studied the format used, and kept a list of the towns or natural attractions already featured.

You should do the same. Do not send the editor a story that he ran only a few days or months earlier. Study how the articles are presented and do likewise. Don't run on and on about how you found the cutest dresses or the best bargains in spark plugs at one

The wife and son of the author enjoy the view from Caesar's Head.

of the local stores. Point out the sights and activities most likely to attract the majority of readers.

The opportunities were not at all hard to find: the truth is that many people are actively looking for people who want to take paid vacations.

But you can't just show up on the doorstep and announce that you are ready to see the bright lights and then ask for loads of money and free tickets to all the places of wonder and delight. No, you must bring something to offer.

The first requisite is that you must take an active interest in travelling to and exploring these places. You can't just visit the resorts and spend the day in front of the television set; you must get out and see what the area has to offer, and you must put forth the effort to see and understand the basic qualities of the attraction. How else will you be able to write a good article about it.

Then you must be able to write about it competently. This does not mean flowing phrases with all sorts of literary quotes and allusions, and it certainly does not mean that you must steep your writing in similes and metaphors and other types of creative and figurative language. You should be able to give crystal clear directions and provide detailed information about the places you have visited.

You must also have a decent camera that will take photos good enough to reproduce in magazines and newspapers. I don't mean that you must purchase a $3,000 outfit, and you don't need all sorts of gadgets and attachments to get the photos you need. Later I'll tell you what kind of camera I use and how much you can expect to pay for one similar to it. Let me say here that my camera has paid for itself at least 50 times already.

But first you need to hear about the job itself.

How I got started

Several years ago I noticed that a large newspaper near us ran a special travel section every Sunday. But what caught my eye primarily was that nearly all of the travel material was canned. That is, it was bought from one of the syndicates that provide feature stories for newspapers.

But most of the trips described were far beyond the reach of the typical wage-earner. After all, not everyone can suddenly drop his tools or briefcase and take off on a Caribbean cruise. Most vacationers that I know travel only two or three hundred miles to their destinations, and many of them camp because they cannot afford hotel and motel rates near the attractions they want to enjoy.

The author and his family earned money while on this trip to Charleston, SC.

One day after we returned from a short trip to the coast of our state, I decided to write a brief article and tell exactly what the traveler needs to know before he decides to make the same trip.

So I included the following information in this order: the name of the place to visit, the major attraction there, the miles to the location and the time needed to drive there, and the best routes. Finally, and this was the major part of the article, I described not only the major attraction but the nearby historical or scenic or recreational opportunities.

The outline of the story is as follows:

Destination: North Carolina's Outer Banks

What's the Attraction?

The Outer Banks location features the tallest lighthouse in the United States as well as a series of other lighthouses, clean and unspoiled beaches, hiking and camping opportunities, museums, and, in general, fun for the entire family.

Driving time:

From Lawndale, North Carolina, driving time for the 480-mile trip is 10 hours, allowing time for a picnic lunch along the way.

Imagine receiving money to tour beautiful gardens like these at Magnolia Plantation near Charleston, SC, as my family and I did.

Getting there:

From Lawndale drive north on US 18, intersect with I-40 East, and remain on I-40 until you reach Raleigh where you will exit I-40 onto US 64. Remain on US 64 into the towns of Manteo and Nags Head.

To see and do:

Touring restored houses, which have become landmarks, is a superb way to take a vacation and earn money.

(At this point describe in detail, giving exact directions to the various activities and attractions. Keep the article to about 600-700 words. Include one or two sharp photos.)

Details:

(At this juncture you should supply admissions charges, if any, to visitors, hours of operation, days closed, best times to see the attraction in terms of weather, daylight, etc., nearest overnight accommodations, nearest restaurants, and similar data.) The above, in essence, is the core of the simple travel story. You can work into longer stories, perhaps, as you continue to impress the editor with your abilities to supply him what he needs.

Before you invest too much time and money, choose a trip that you can make easily in a day or, better yet, half a day. Borrow a camera if you must, or ask the Department of Travel and Tourism to help you secure photos. Write the article as shown above and mail it to the travel editor.

Don't submit simply to "Travel Editor." Take a few minutes and study the newspaper staff. Learn the editor's name. A story addressed to "Editor" is much like mail you get addressed to "Occupant."

Don't call the editor. He may be tied up in the details of his office work, and he may not wish to be disturbed. Instead, send in the story and photos, and include your name, address, and telephone number. If you are away from the phone much of the day, include the hours you will be at home. Don't ask the man or woman to call you every 15 minutes until you are finally at home.

You may have to try several newspapers before you find the one you need. If the newspaper is 100 miles away, don't worry. The telephone and United States mail service will serve you very adequately.

Keep trying if you are rebuffed at first. Remember that the paper must either use canned material, send the editor himself out on the assignment, buy freelance articles, or stop running travel stories. Think about the ramifications of the four options.

The editor must pay for the canned material, so if he's going to use his budget on travel stories, why wouldn't he want to buy a story about a place near his newspaper rather than one about travel in Tibet? National Geographic does it so much better than he can. Second, the editor edits. He cannot spend his days gadding about the countryside and still get his office work done. Fourth, much of the advertisement income of the paper comes from the travel section where cruise lines and touring companies like to tout their services, so the editor isn't likely to surrender this money.

That leaves third, buying freelance material.

The pay is not great. You may earn $25 to $100 for each short story, but you will learn very quickly that you can take a trip and stop at a half-dozen places along the way and do a story about each of them. Suppose you earn $50 per story and you can do eight stories in a day: that's $400 for a day's work—except for the writing, which you will do after you return.

Eight stories in one day? Believe me, it's possible. You will be amazed at how efficient you can become with a little practice, and you don't have to rush frantically from one place to another, as long as they are fairly close geographically.

After the editor starts to trust your work (Don't ever fake a story or become careless with details like mileage. The last thing you want—and the last thing you will get from that paper—is an irate family that took a holiday and found that the trip is 275 miles, not the 75 miles you stated in your article.)

There's nothing like getting paid to see the sights of the nation's capital.

Choose a reliable camera

Now, about cameras. I have used a Canon EOS Rebel for years now, and it has never failed me. Such a camera will cost you about $400, give or take. Use color film and get one-hour photo service at one of the discount houses. Often at the end of a trip I will drop off my film, then go eat. When I come back the film is ready, and it is processed well.

After a while, ask for large travel assignments, which pay more and are more work. You can get in a lot of side trips on these vacation trips and earn a great deal more money.

Finally, with the editor's permission, contact other editors of papers outside your reading area and sell the story again. I have sold the same story 36 times. Figure $50 times 36: That's $1,800 for about four or five hours of work.

Then try travel magazines. Some of these pay $1000 or more for a single story. Some pay only five cents a word, so if your story is 1,500 words, you earn $75. But remember: photos often bring in extra money. I sell photos regularly for $50 to $100 extra. And, with permission, you can sell the story to more than one travel magazine.

But be very careful! Re-sell only with permission of the first buyer and with the awareness of the others.

A final point: when you arrive at the attraction, find the person in charge and introduce yourself as a writer on special assignment from the newspaper. You'll not likely be asked to pay for admission to any of the special places.

That, in a large nutshell, is it. We found that writing the travel story is the best way in the world for us to take a family vacation. The old adage is that the best part of a vacation is coming back home.

Wrong! The best part of a vacation is getting paid to take and enjoy it! Δ

A way of life that is odd or even erratic but interferes with no rights or interests of others is not to be condemned because it is different.

Warren E. Burger
Chief Justice, U.S. Supreme Court

If Karl, instead of writing a lot about capital, had made a lot of it it would have been a lot better.

Karl Marx's mother
(from Ain't Nobody's Business if You Do by Peter McWilliams)

Ayoob on firearms

By Massad Ayoob

Mossberg Model 500: the backwoods shotgun

In 1961, the firm of O.F. Mossberg & Sons introduced their first conventional slide-action shotgun, designed in-house by Carl Benson. Until then, Mossberg was best known for inexpensive .22s, remarkably affordable .22 match target rifles, and cheap bolt-action shotguns. The new Model 500 was designed to duplicate the function of the famous, and more expensive, pump shotguns favored by sportsmen: Winchester's historic Model 12, Ithaca's light, fast Model 37, and Remington's popular Model 870.

Success was beyond expectation. Today, with production nearing eight million, the Model 500 in its assorted variations is the best seller in Mossberg's catalog by far, and a staple in gun racks of rural homes everywhere.

Price is half the reason for its success. In 1962, a price check of field-grade 12-gauge pump shotguns would have shown the Winchester at $109.15 suggested retail, the Ithaca at $94.95, and the Remington at $89.45…by comparison, the Mossberg was $74.95.

A contemporary price difference remains. The successor of Winchester's Model 12, the less well executed Model 1300 Ranger, starts at $300…the Ithaca pump, now the Model 87, starts at $477… Remington's lowest priced 870 Express is just under $300…and the Mossberg 500 starts around $266 while the even lower priced version that Mossberg calls the Maverick can be had for as little as $219.

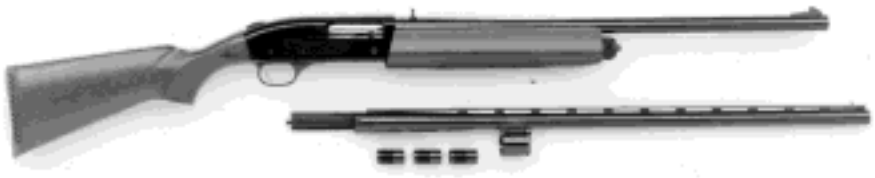
The other half of the Mossberg 500 success formula has been functionality. Built to be kicked around the bottom of a duck boat for a couple of lifetimes, it stands up remarkably well, yet handles easily due to its lightweight aluminum alloy frame. The heavy-duty "mil-spec" version, the Model 590, beat every other brand in US military service tests and is the standard military police/jungle warfare weapon for our armed services today. The 590 saw a lot of use during Desert Storm, I'm told.

Massad Ayoob

Legendary small arms instructor Jeff Cooper thought enough of the Mossberg pump guns to co-star with them in his training film on defensive use of the shotgun. Chuck Taylor, another noted combat arms authority, recently did an article praising the Model 500 and 590 as functional, basic, troublefree weapons that he wholeheartedly approved.

At my school, Lethal Force Institute, Mossberg ties with Remington as the brand students are most likely to bring to a shotgun class. The Mossbergs do as well as the Remingtons, and generally outclass the modern Winchesters. We maintain several 12 and 20-gauge pump guns in our armory as loaners for these classes—Remingtons and Mossbergs—and the two seem to per-

Mossberg Model 500 Combo, pump shotgun



Mossberg Model 9200 Combo, autoloading shotgun

form equally well with minimum frequency of repair.

There was a period in the early through mid-Eighties when Mossberg quality control slumped badly. I could not recommend a gun of that period. It's a family run company, fortunately, and in the late Eighties CEO Alan Mossberg made the commitment to install expensive CNC machinery that brought QC back up. Today's Mossbergs work well, as evidenced by their winning the military tests.

Frankly, I'm partial to the ergonomics of the gun. I like the 500 because it's light and fast handling…its open bottom allows faster loading and reloading than the Ripping "loading gates" of some of its contemporaries…and, particularly, its top-tang safety is more ergonomic than the crossbolt safeties catches on most other pump guns, including their own downmarket Maverick.

I've seen even trained cops fumble at the crossbolt safety catch on the trigger guard of their shotgun. The sliding safety is worked by the thumb, ambidextrously, and is excruciatingly simple: back is "safe," and forward is "fire." I find this both safer, and faster to employ.

Victor and Cheryl Havlin wrote an excellent history of the company called "Mossberg: More Gun for the Money." Victor is head of the National Mossberg Collectors' Association, an excellent source of parts for old, discontinued Mossberg guns that are so prevalent in rural homes. For info on the book or the association, write to Vic Havlin at NMCA, PO Box 487, Festus, MO 63028.

Collecting Mossbergs strikes me as an eminently sensible way to start gun collecting on a budget. A collection of Greener or Winchester Model 21 shotguns is, in one sense, a celebration of the lifestyles of the rich and famous, while collecting guns designed for the average working American is an investment in the kind of work ethic that built this country.

For those who prefer the semiautomatic shotgun, Mossberg's relatively new Model 9200 is worth checking out. It's the only auto shotgun I know of with the desirable top-tang manual safety, and its gas operation system reduces recoil extremely well. This firearm is the core of the military's new "Jungle Gun," for which Mossberg seems to have won the contract: a high performance, low maintenance weapon designed to be used in third world ground conflicts and international drug interdictions that involve thick cover. It's the one autoloading shotgun I haven't been able to make jam even firing light-recoil "tactical" loads from weak, off-balance "emergency positions" where the gun is not firmly mounted to the shoulder. Cost-effectiveness is there with the "automatic" shotgun, too, with the Mossberg 9200 starting at $443, versus $625 for the Remington 11-87, $772.95 for the Browning Automatic Five, $895 for the Benelli MI Super 90, and $660 for the cheapest Beretta Model 1201.

Some firearms purists are put off by the plastic trigger guard or the light feel of the aluminum frame of the Mossberg 500. I don't deny that there are other guns whose actions are smoother, justifying their higher price. But there are compelling reasons why this shotgun, often bought at a discount from K-Mart or Wal-Mart, has been so naturally taken to the bosom of the average citizen, especially the rural American.

It's efficient. It works. It's frugal. And, in all of that, it's an embodiment of values that are prized by the kind of person who can be at home in the backwoods. Δ

Here's 5 reasons adults should read kids' books

By Kathryn Houser

At a recent library book sale I scoured the shelves for interesting books on science and history for my children. Buoyed by success, I struggled to my van with a hernia-popping load for about $10. When I arrived home I watched my daughters dive excitedly into the carton. As they scrutinized the volumes I found myself saying, "Wow, I'd like to read that one," and "I'd love to know more about that," and "I always wondered what that guy did." I felt a stab of envy that I had not read books like these when I was their age and had unlimited reading time. Then a startling thought came to me: why not read them now?

If you are like me, your first response is: Why would I want to read children's books when the library is full of material for adults on the same topics? Luckily, I put aside my doubts and I read many of the books. Now I can give you five great reasons to become devoted to the juvenile section of any library or bookstore.

Reason #1: The first reason to read children's books is that the author begins at the beginning. Little or no knowledge is presupposed so you never have a nagging feeling that you missed something early on.

Reason #2: Subject matter is presented in an interesting or entertaining manner to maintain attention. Humor is frequently employed, which is sadly lacking in many adult non-fiction titles.

Reason #3: The "big picture" is presented right away. Children's authors build a solid framework before they inundate the reader with details. Material is unconcentrated enough to allow the reader to pick it up and put it down without "losing the thread." This is a boon for any grown-up who must do something other than read all day.

Reason #4: Experimentation and thought are welcomed. In the sciences particularly, hands-on investigation is encouraged. Children are not asked to accept information without testing it for themselves. This provides a solid basis for understanding concepts.

Reason #5: (Probably my favorite reason.) Children's authors express no ego while demonstrating their superior knowledge. Nobody expects a kid to be an expert so "showing off' is pointless. Explanations are clear and thorough. The language is straightforward and enough space is used to treat an idea without glossing over key issues. You soak up great information and no one makes you feel ignorant in the process.

You now are convinced that this is a great idea but you object that there will not be any kids' books about your particular interests. Think again. Just in the last six months my daughters and I have devoured books about genetics, anatomy, chemistry, pirates, weather, economics, cartooning, the orchestra, ancient Egypt, astronomy, and classic literature. Most of these titles were borrowed for free from the public library. Higher education does not have to be expensive.

The first step in your quest for knowledge is to raid your offspring's bookshelves. Next, grab your library card and haunt the children's services section of your local library. Pretend you are checking the books out for your kids if you feel out of place. Once you get started, though, I bet you will be so enthusiastic about this method that you will talk about it to anyone willing to listen. Let the secret out, learning is too exciting to be left to kids. Please understand that I advocate this as the beginning of your studies, not the end. If you still thirst for more information after reading several juvenile titles, tackle adult materials about your topic. Begin with the basics and work your way toward whatever level of expertise you desire. You will discover you have constructed a solid foundation of knowledge onto which you can build as high a tower of understanding as you wish.

The most exciting thing about this formula is that the learning you choose to undertake will last forever. Economics author Richard Maybury agrees: "Self-teaching is a form of education that sticks, and it can continue and remain enjoyable for life." Δ

How about them $mushrooms$

By Robert Rowe

Little known and little advertised is the growing trade in wild edible mushrooms. With exports exceeding $40 million yearly it is fast becoming a major cash crop leaving land managers in state and federal forests scratching their heads as to how this happened so fast. Degradation of forest ecosystems in Europe and Japan and the fact that the United States, especially the Northwest, has mass fruitings of correspondingly favorite species has left many folks to making very handsome incomes in this trade. If a commercial harvester of wild edible mushrooms were to tell you that he (or she) averaged $200 dollars a day season wide it is doubtful that he is exaggerating.

Along with increased commercial harvests of wild edibles and a general curiosity by folks to try some of these culinary delights have come a few poisonings. So it is vital that the novice picker confirm identifications of mushrooms with a knowledgeable harvester. If none are known to you, contact the North American Mycological Association at 3556 Oakwood, Ann Arbor, MI. 48104. Tel.: (313) 971-2532. They have chapters all over the country with folks willing to help with identification. If you live in the Northwest, where the bulk of the commercial activity occurs, check the local papers for mushroom buyers and have a close look at what they are taking in. Once you have held a particular wild edible and examined it closely, noting texture and smell, it is unlikely that you will confuse it with another species.

The equipment

Common sense is the watchword here. Different terrains require different equipment. Generally speaking a good pair of hiking boots or lighter hiking tennis shoes are a must. As a harvester you will be covering a lot of ground. A stainless steel Swiss knife, some five-gallon buckets (easily obtained from a restaurant), a pack frame

The author with one day's buying of morels—about 1,000 pounds.

Common morel

as well as a compass and a good USGS or USFS map of the area that you will be in will get you started. As your harvesting talents grow so will your knowledge of what you require on a species by species basis.

Do not shirk on getting the required paperwork such as permits. Since most harvesting occurs on or in national forests and each forest has differing permit schedules, checking the closest ranger station to your area of operations is recommended. If you have discovered a "patch" on private property it would behoove you to get the owners permission—a promise of a couple of pounds of fresh mushrooms for the table will go a long way towards opening gates.

The sale

Top prices for your wild edibles will be paid by the better restaurants in larger cities such as New York, Chicago or San Francisco. This type of direct marketing, while the most lucrative, does have its drawbacks and risks. You will have to arrange shipping (overnight express), you will have weight loss due to dehydration and your money will take a while to reach you. On top of that, some chefs are quite fickle and may reject the entire load. Arranging this type of sale

A Backwoods Home Anthology

requires calls by you directed to the head chef at the restaurant that you choose. Be sure to be perfectly clear as to what product you have and firm in your price negotiations.

Selling your mushrooms at established buying stations assures you of a cash payout on the spot. You risk nothing and are free to attend to the total details of harvesting more mushrooms, however, the price you receive will not be as much. Buying stations are also an excellent spot to root out information on the ongoing season. A knowledgeable buyer can steer you towards productive areas as well as inform you as to future locations where they will be buying. (Many buyers follow mushrooms fruitings as they occur.) Bear in mind, too, that a commercial buyer will usually buy several species of wild edibles in conjunction to what they are in the area for and this represents an opportunity for the novice to see and identify other species worth picking.

Pine mushroom harvesters with baskets laid out for easy grading by buyer

The big four

The following four species are the most extensively harvested for domestic and international sale. They can be found throughout the United States where conditions permit. However, the author is most familiar with the foibles of these wild edibles as they fruit in the Northwest and now offers a few tricks and hints in hunting them.

Fire Morels (morechella elata) (M. conica) (var. nigripes):

I list this species first not because it is the most valuable of wild edibles but because it is the most predictable to find. In the Pacific Northwest mass fruitings occur the spring after major forest fires in and east of the Cascade Mountains, in the Blue Mountains of southeast Washington and northeast Oregon as well as the western slopes of the Rockies from Northern California up through British Columbia, the Yukon Territory and Alaska. It is because of this predictability that they are subject to much commercial exploitation. Larger fires can expect several buyers setting up stations and hundreds of pickers.

The prudent morel harvester begins his or her research during the forest fire season by carefully marking the location of fires on maps for reference the following spring. Preseason scouting is a must in order to determine whether conditions will be correct for a large "flush." With spring weather cooperating even small wildfire areas can produce many thousands of pounds. Aggressive pickers can average 80+ pounds daily during the height of the season. With an average price of $4 dollars a pound we can see that handsome sums are indeed earned.

Pine Mushroom or Matsutake (Tricholoma magnivelare):

The pine mushroom is probably the most valuable fungi you will find in the forest and nearly all mushrooms that are harvested are shipped fresh to market within 48 hours to Japan. The 1992 fall season recorded a high for the price of #1s (there are 5 grades) of $525 dollars a pound. At commercial buying stations competition is fierce between buyers with price wars often erupting driving the price up for pickers. Commercial activity begins in early fall in northern British Columbia. As the season develops this "flush" moves further south into the southern Puget Sound region of Washington State. In October one can find considerable activity in the Cascades of Central Oregon with a small wide spot on Highway 58 called Crescent Lake being the center of buying. A dozen or more buyers will be set up and some 1000 harvesters will be working these productive areas. In November the harvest moves even further south into southwest Oregon and northwest California and it is here that the Pine mushrooms is associated more with the tanoak tree than the usual conifers of the north.

The pine mushroom is indeed a wily mushroom. While most are found by moving through the forest searching

For those who wish to hunt or know the more esoteric of wild edibles, I offer the following list. A limited market may be found for these species as some commercial buyers will have orders to fill or you may get a specific request from a chef.

Chicken of the Woods	Laetiporus sulphureus
Hedgehog	Hydnum repandum
Horn of Plenty	Craterellus cornucopiodes
Lobster Mushroom	Hypomyces lactifllorum
Oyster Mushroom	Pleurotus ostreatus
Truffle	Picoa carthusiana
Oregon White Truffle	Tuber gibbosum

for mature mushrooms, the more experienced pickers are always carefully examining the detritus of the forest floor searching for newly formed humps or bumps indicating that a young mushroom is pushing itself to the surface. Since mostly grade 1's are found in this way more profit per pound can be expected.

Grade 1 pines are described as a young mushroom with the characteristic veil fully attached from stem to cap. Grade 2 has a least 50% attachment of veil while grade 3 goes from 50% down to slightly attached. Grade 4 will have a fully down-curled cap (fully inrolled margin) and grade 5s are a mature flat capped mushroom.

The Chanterelle (Cantherellus cibarius):

The chanterelle is on the "Red List" of Germany meaning that no commercial picking is allowed and very little recreational picking either. Consequently, since the Northwest has amazing fruitings, enormous quantities are purchased here and placed in a salt brine solution for shipment to Germany where they are then canned. The bulk of the harvesting occurs in the coast ranges of Washington and Oregon and on the western slopes of the Cascades. Many, many tons are harvested annually.

The Chanterelle is a fall mushroom that will show itself after the first rains begin in September. A general rule I like to apply to finding this mushroom is termed "triple D." This refers to conditions in the forest that this mushroom prefers—deep, dark and dank and is generally allied with heavy timber. Old growth timber is not required for significant fruitings, however conifer forests are a must here in the Northwest. Plan on doing a bit of trekking about the brush as patches can be few and far between. A compass is pretty worthless in this heavy timbered country so I like to carry along a roll of timber cruisers trail marking ribbon. Costs about a buck a roll and marking your trail will save a bit of wandering around if you get turned around.

Author's grandmother Wilma with mature kings. A picker for 80 years and still going strong

The Chanterelle will handle storage in the cooler for up to two weeks without much weight loss. This mushroom is quite well known to chefs and sales of it should be easy to arrange if there are no buying stations about. Picking this mushroom clean is a must as a few dirty mushrooms in your bucket may precipitate a long and tedious cleaning session. The preferred method is to cut the stems while the mushroom is still in the ground thereby preserving the underground mycelium at the same time.

The King (Boletus edulis):

Upon finding your first mature king you will realize that it is properly named. Specimens a foot high, a foot across and several inches thick are common in our northwestern forests. The king is also a fall mushroom and is a favorite of Europeans where it enjoys more nicknames than there are languages. Examples include *cepe* (France), *penny bun* (United Kingdom), *steinpilz* (Germany) and *porcini* (Italy). It is very popular, very tasty and highly sought after by chefs here in the United States.

Look for Kings under conifers (pine, spruce, firs). Large fruitings occur on the coasts of British Columbia, Oregon and Washington. There is also a variety of King that is found in the spring in the Blue, Rocky, Cascade and Sierra Nevada Mountain Ranges but are not found in such quantities. Mark your picking maps carefully as the King is apt to return to the same location year after year.

Commercially the King has three grades with grade 1 being described as a young "button." Grade 2s are slightly older mushroom whose pore mass under the cap is still white to a light tan in color and a grade 3 is a fully mature mushroom.

Suggested reading

Mushroom Demystified by David Arora, Ten Speed Press, Berkeley, California, 1989.

Ecology and Social Aspects of Wild Edible Mushrooms by R. Molina, et al., USDA Forest Service. Can be obtained free by writing USDA Forest Service PAO, 333 SW First Ave., Portland, OR 97208. Δ

Think of it this way…

By John Silveira

Science and truth — are they related?

It was an argument about science. Dave and I were on one side, Dave's friends Tom and Bill, though curiously nonallied, were on the other. I say nonallied because Tom is very religious while Bill is an environmentalist somewhat to the left of Hillary. And though they disagreed on other things, in this discussion neither of them had much use for science.

To summarize Tom's position, he said science wasn't any more valid than any other belief and he believed, quite frankly, in creationist theory. Bill agreed science wasn't any more valid than any other belief, but the expression he used was that all beliefs are relative. He also was fond of qualifying everything Dave or I said with the phrase, "That's your opinion." You'll never know how irritated I was getting.

In the meantime, O.E. MacDougal, Dave's poker playing friend, sat in the corner reading. Every once in awhile he'd look over his book at us, but he didn't join in the conversation.

Tom said, "Science is just like religion, it's just a set of beliefs. It's no more valid than any other set of beliefs."

"There are no absolutes," Bill added. "All systems of belief are relative."

It was more than I could take, but I couldn't think of anything to say except, "Mac, what do you think?"

Dave looked to Mac, too.

"Who's that?" Tom asked looking into the corner where Mac sat reading. Bill had met Mac before and I don't know whether Mac realized it, but Bill didn't like him. If he knew, he didn't care.

"It's O.E. MacDougal," Dave said. "Mac, meet Tom—you've met Bill before." Then he turned to Tom and said, "Tom, meet Mac."

Mac stood, crossed the room and shook Tom's hand. "Glad to meet you, Tom." Then he shook Bill's, said "Nice to see you again," and went back to the corner and started reading again.

"Well?" Dave asked.

Mac looked over his book.

"Have you been following what we've been talking about?"

"Off and on."

"What do you have to say?" I asked. "Is science any more valid than religion or philosophy?"

Mac got a pained look on his face. I think he just wanted to read.

"Who's this guy?" Tom asked again. He looked at Bill who rolled his eyes.

"A friend," Dave answered. "I'd just like to hear what he has to say."

"You want to join our little discussion group?" Tom asked.

It was obvious Mac wanted to be left alone, but he put his book in his lap and said, "Your comment begs the question of what you mean by the word 'valid.'"

"There's a nonanswer if I've ever heard one," Bill laughed.

Mac smiled.

"What do you mean?" I asked.

"If I said a Cadillac is no better than a Honda, what would you say?"

"I'd agree," I said and Dave and Mac laughed because I own a Honda.

"Then what if I said a Cadillac is better than a Honda?"

"I'd say, it would depend on what you meant by 'better.'"

"Okay, then it depends on what we mean by 'better.' And when Tom said science is no more valid than religion, did you all agree to what the word 'valid' meant in that sentence."

John Silveira

"I would imagine he meant 'true,'" I said.

"Okay, then what are you measuring truth against."

"Truth is relative," Bill said.

"Then how are you guys using the word 'relative'?" Mac asked.

"This isn't going anywhere," Bill said. "I think we all know what it means."

"Why don't you tell us how you define it?" Tom asked Mac.

"This is your discussion. I shouldn't be the one defining the terms."

"The word 'true' is relative," Bill said and Tom agreed saying:

"They're words that mean different things to different people."

"It's not enough to just agree that 'valid' or 'true' mean different things to different people at different times. We also have to agree on what we mean by them at this moment in this discussion."

"Tell us what you mean by it?" Tom said to Mac.

"I was hoping I could get you guys to explain how you were using 'true'

When the Greek city of Syracuse was invaded by the Romans, orders were that Archimedes, the greatest scientist of his time, was to be spared. But, engrossed in his work, he failed to acknowledge the demands of a Roman soldier who then killed him.

and 'valid' in relation to science. I wanted to hear what you think science is because I don't think you even agree on that."

He looked at Tom. "What's science to you?"

"It's a secular opinion of how the world works, but just one of many ways of viewing the world."

"What about you?" Mac asked me.

"I think it's a collection of facts and data...and theories."

He looked at Dave.

"It's a way of proving things...proving theories."

He looked at Bill.

"I agree with Tom when he says it's one of many ways of looking at things."

"See, it's all relative," Tom said.

"Well, I suppose there's an element of truth in what each of you said. And, Bill, Tom, you two probably came the closest."

"What do you mean?" I asked because I figured I'd come the closest.

"Science certainly depends on facts and theories," he said. "And, using the scientific method, although we don't prove theories, we provide evidence for them…"

"What do you mean we don't prove theories?" I asked.

"Nothing is 'proved' in science. Among scientists, 'proof' is reserved for mathematical theorems—or at least it should be. All we ever do in science is provide evidence for a theory."

"That's not the way I learned it," I said.

"And that's another problem," he said.

"What problem?" Dave asked.

"The way we learn about science in school and the way we're informed about it in the press."

"But what about truth?" I asked.

No truth in science

"There is no 'truth' in science. Either theories have evidence to support them or evidence supports the idea that a theory is an inaccurate view of reality. But even if the evidence supports a theory today, tomorrow, new evidence may show the theory needs revision. It happens all the time. That's what happened with Isaac Newton's theories of mechanics and universal gravitation. For a couple of centuries all the evidence seemed to show his theories explained the universe precisely and were deemed 'true.' But in the late 19th century evidence started to accumulate that disturbed scientists. They were discovering phenomena Newton's theory didn't account for. It was in explaining how these new pieces of evidence, as well as other ideas, fit into a more comprehensive theory that Albert Einstein made his mark. And Newton's theory which had appeared to be 'true' for so long was finally shown to be—for lack of a better word—untrue. Now Einstein's theory is the new 'truth.' But even his theories may fall by the wayside, and Einstein himself once said that no amount of experimentation would ever prove his theories were right, but just one experiment could prove him wrong."

"Then you're saying science is just a bunch of opinions," I said.

He shook his head from side to side. "Science is a process…it's a method."

"Science is just a western invention," Bill said.

"That's right," Mac said offhandedly.

"What?" I yelped.

"Well, it is," Mac said.

"How can you say that? That's not what I was taught…" I was getting pretty loud.

"Calm down, John," Dave said.

"It's an invention of western civilization," Mac said. "It's a way of looking at the universe. It's a philosophy with a set of rules just like any other philosophy—or religion. But," and he hesitated on the word 'but' to add emphasis, "it happens to be the most spectacularly successful philosophy ever devised for interpreting reality…"

"That's your opinion," Bill interrupted, but Mac continued:

"The reason is, when a scientific theory doesn't correspond to reality, the scientist assumes the theory is wrong and he attempts to modify it or he goes out to look for a better theory. In contrast, when a religious, political, or philosophical doctrine doesn't correspond to reality, all too often it's evidence that is assumed to be wrong."

"That's baloney," Tom said.

"Give us an example," Dave said to Mac.

"Well, for example, creationists have seen the fossil record and it doesn't agree with their view of how the world came about. So they've

decided to keep their 'theory' and pronounced the fossil record—what is otherwise called evidence—wrong. They've questioned radioactive dating and said dinosaurs were simply antediluvian animals that weren't taken on the ark and therefore were drowned. They've even suggested fossils aren't real, that they're just a test God has put there to see if he can bring on doubt. One even told me they're one of God's jokes."

"Radioactive dating is just statistics," Tom said.

"Just statistics," Mac said. "That's another issue we'll have to consider…"

"But from the scientific point of view, isn't evolution accepted as true?" Dave interrupted.

"No. But it is considered fairly accurate. There's a lot of 'evidence' supporting evolutionary theory, but Darwin's view of it is now being questioned. He proposed evolution was more or less constant with new species gradually emerging through random selection. But the fossil record doesn't always support this. Some evolutionists are proposing that evolution may reach periods of equilibrium where nature appears to become balanced—with some gradual evolution, as Darwin believed—but that most evolution is due to catastrophic conditions that have punctuated life on earth.

"A good example would be that at the end of the cretaceous period, dinosaurs and other animals were living in a world that had reached a fair amount of equilibrium. There's evidence that evolution was progressing slowly in response to changing environmental pressures such as the slow shifting of the tectonic plates. Then, some environmental catastrophe—most likely a comet or an asteroid colliding with the earth—changed everything. The dinosaurs abruptly disappeared and with all of these higher niches now empty, the survivors started rapidly evolving to fill them."

"But you're not saying evolution is in question with those guys; it's just a question of whether or not to modify Darwin's theory based on the fossil record," Dave said.

There is no 'truth' in science. Either theories have evidence to support them or evidence supports the idea that a theory is an inaccurate view of reality.

"That's right," Mac said.

"There are plenty of scientists who disagree with evolution," Tom said.

"I'm not sure what 'plenty' means," Mac replied. "But I think you're talking about creationists. And the fact is, they may be right. But what creationists are practicing is not science, but religion."

"I beg to differ with you. Some of them are eminent scientists."

"I didn't say they weren't scientists. I just said they aren't practicing science when they say those things."

"Oh, come on," Tom said.

Bill caught Tom's eye. He smiled and shrugged.

"Wait a minute, what do you mean by that?" Dave asked Mac.

"That's why I said we should agree on a definition of what science is."

"What's your definition of science?" Dave asked.

"The word science is used to describe a lot of things. Everything from, 'there's a a real science to making a good apple pie' to describing how physics is conducted in a laboratory."

"See, I told you; it's all relative," Bill said.

"But I prefer to use the word science when the scientific method is involved," Mac added.

"And scientists don't make their assessments based on religion," I said to Tom and I was a little bit startled when Mac looked at me and shook his head sideways.

"That's not quite true, John. Einstein, the greatest scientist of our century, rejected quantum mechanics, which is one of the cornerstones of modern science and one of the most spectacularly successful theories in history. He rejected it on religious grounds because it introduced uncertainty into physics. What he said was, 'I shall never believe that God plays dice with the world.'

"And Isaac Newton, perhaps the greatest scientist who ever lived, rejected a relative universe—one in which motion is relative to the observer, meaning there are no absolute reference points that indicate one's 'true' position in the universe—on religious grounds and thereby missed out on one of the two cornerstone postulates of Einstein's Restricted Theory of Relativity."

"What's relative motion got to do with religion?" Tom asked.

"Newton couldn't accept that all motion is relative, that there isn't an absolute reference frame against which all objects in the universe move because the position of God in the universe was absolute and not relative. It was a holdover from the days when heaven was fixed and the earth was thought to be the center of the universe.

Robert Boyle confounded his contemporaries by insisting theories should be verified by experimentation.

Isaac Newton, though a loner throughout his life and a religious eccentric late in life, did more to influence civilization with his invention of calculus, his theory of universal gravitation, and his laws of motion than any other man ever to have lived.

"But neither Einstein nor Newton based their assessment on science. Yet, either or both of their statements could be true because there's no 'proof'—to use the p-word again—to say they were wrong, even though there's a lot of evidence indicating they were."

"I'm kind of confused," Dave said. What's this scientific method and who came up with it?"

Mac thought a moment.

The origins of science

"In fact," Dave interrupted, "science seems to be pretty new. Why don't we hear about scientists from like a thousand or two thousand years ago?"

"That's a good question. Let's start with where science and the scientific method came from first, because it's actually kind of interesting. What do you guys know about the history of science?"

"I suppose he's going to tell us," Bill said.

"I'd like to hear it," Dave said.

"I'm interested," Tom added.

I just took notes.

"Well, you yourself said modern science is a western invention," Mac said to Bill. "But the rudiments of that science were shared by all societies and, in particular, all early civilizations. Certainly some sort of rudimentary agricultural science had to be developed to allow men to plant and harvest; and math, the so-called queen of the sciences, had its origins lost in antiquity. And all civilizations seemed to have studied astronomy.

"But it's worth noting that even though today we think of science, religion, and philosophy as separate issues, back in those times the three were one. For example, no one studied astronomy without considering the religious aspects of it.

"The stone structures that dotted northern Europe, for instance, of which the most famous is Stonehenge, were astronomical observatories with the capability of marking the equinoxes, the solstices, and predicting both solar and lunar eclipses. Building them required a level of mathematical and astronomical sophistication that would not reappear in that part of Europe for centuries. But these were more than just observatories, they apparently also had deep religious significance for their builders."

"But the sophistication for building those things was lost?" I asked.

"Yes, not to reappear for thousands of years. In fact, it's ironic that though modern science was invented in the west, throughout history the west usually trailed behind the rest of the world. In particular it lagged behind China."

"The Chinese were ahead of us scientifically?" I asked.

"In both science and technology they were ahead of us for centuries. For example, today we consider the ancient Chinese such reliable observers of astronomical events that it's their records we go to when we want to verify the reporting of celestial events—like comets or the sighting of supernovas—by ancient observers in the west.

"Still, with very few exceptions, like the invention of the calendar, science had very little practical use or impact on people's lives.

Archimedes

"But there was at least one bright spot in the ancient western world and, if someone wanted to say the beginning of modern science started with the man they called Archimedes, I wouldn't argue."

"I've heard of him," I said.

"He was one of the most brilliant men who ever lived," Mac said. "He made contributions not only in pure mathematics and geometry but in mathematical physics. He almost invented integral calculus. His formulations on the laws of the lever, his invention of the compound pulley, his work with hydraulics, optics, the densities of materials…" Mac threw his hands up. "…all kinds of things, though elementary in today's science, were quantum leaps over his predecessors. The world would have to wait 1900 years, until Newton, to see a comparable genius.

"In his own time, his renown was such that, when the Romans captured the Greek city of Syracuse, where he lived, the soldiers were told that at all costs Archimedes was to be taken alive. He was, quite frankly, one of the most important men in the world. But one soldier coming across an old man demanded his attention. The old man ignored him and kept doodling figures in the sand with a stick. The soldier killed him on the spot."

"And that was Archimedes?" Dave asked.

"Sure was."

"Modern science should have started right there with Archimedes. But it didn't. In fact, it seems the world went downhill. There were brilliant men, lots of theories, and many technological advancements. But very little advancement in science—at least in Europe.

"During the so-called Dark Ages, technology continued to progress in Europe but science itself languished. In the meantime, in the emerging Islamic empire, science and mathematics were not ignored. In particular, the Moslems developed algebra. It's hard to imagine modern science arising without algebra. Calculus, as invented by Newton and Leibnitz, would have been impossible without algebra having been invented first. And without calculus there is no modern physics, no modern electronics, no modern engineering feats.

"Why did the Moslems share their knowledge with the Europeans?" Dave asked.

"They didn't. When they were finally forced out of Western Europe, they left behind their libraries. It was when European Christians went through those libraries, with the help of Jewish translators, that Europeans rediscovered the works of the Greeks and early Romans. In particular, they rediscovered Aristotle and Archimedes.

"They also discovered a concept developed in India that the Moslems found useful. It was a concept unknown in the west until then. It was the concept of the number zero. And along with zero came the Hindu numbering system, which we call Arabic numerals—our common 1,2,3,10, 20, 100, etc.—that made calculations easier. Until then, Roman numerals were used. Quick, what's MCM times DLI? Roman numerals were not easy to calculate with.

"But this all happened at just the right time because a great new period of culture and learning was starting in Europe."

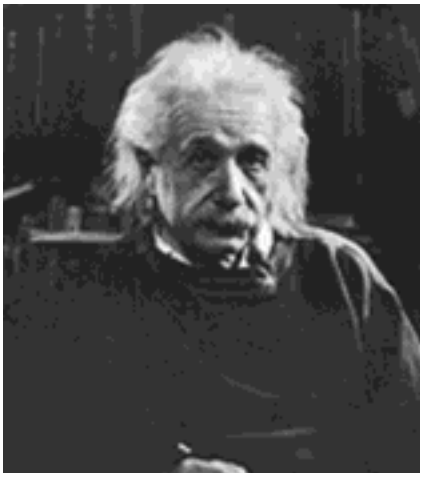
"The Renaissance," I guessed.

"That's right. It was a time of tremendous technological, artistic, and cultural advancements. But even then, science was still treated like any philosophy. And the 'proof' of a scientific theory was not experimentation; it was still, 'Does it appeal to reason?'"

"It seems if science and philosophy were still tied into religion, that since they didn't test theological theories with experimentation, it wouldn't occur to them that it might be necessary to test theories about the physical world," Dave said.

"And that's part of the reason they didn't test them."

"There was more to it?" I asked.



Albert Einstein is the best known scientist of the 20th century and he was the first man to successfully challenge Isaac Newton's theories.

"Sure. What stood in the way of the early Renaissance men were the same things that stood in the way of men in Archimedes's time, and it ensured that until the Renaissance men were observers and weren't inclined to set up experiments to see if a theory was correct. The problems were:

"One: There was a lack of tools and measurements. For example, there was no way of measuring time accurately—no stop watches. Also, there were no microscopes or telescopes. There was just a real shortage of tools.

"Two: There was a lack of sophisticated math. Modern science depends heavily on mathematics for modeling, for calculations, and for analyzing data.

"Three: There was also a lack of previous science to build on. Those we would call the scientists of ancient times—the astrologers, alchemists, mathematicians, and what have you—kept their discoveries secret and often died without revealing them. So whatever they discovered—processes, chemicals, even mathematical techniques—had to be rediscovered over and over again by later generations.

"But with the Renaissance, new tools were invented. Mathematics advanced, especially after Newton. And men began to publish, so knowledge was shared.

Robert Boyle

"Still, experimentation wasn't common. Not until the 17th century when an Irish-English chemist named Robert Boyle came along. Others before him—Galileo, Kepler, Newton, and others—sometimes referred to the real world to make observations and show some statement was valid, but Boyle did something that confounded his contemporaries: He assiduously conducted experiments to verify all of his theories. To his contemporaries, Boyle was a little odd because to them reason was still more important than experimentation. But Boyle had tremendous success in science with his methods and is today considered the founder of modern chemistry.

"He designed laboratory equipment including the gas pump, and formulated a theory of gases that now bears his name—Boyle's law of gases. He was the first to observe that something in the air, namely oxygen, combined with materials as they burned. He also discovered that metals gain weight when they oxidize. He made important discoveries, but more importantly he was one of the first proponents of this new scientific method."

"And what is that method?" I asked.

"I think you can guess."

No one said anything.

The scientific method

"But I'll tell you. This method, more or less, is what propelled western scientists ahead of the rest of the world, and it is the basis of how science is

The scientific method consists of just a few steps but it applies to any field of science. These steps are:

1. *Observe phenomena.*
2. *Formulate a theory to explain the phenomena.*
3. *The theory should encompass something greater than just the observed phenomena.*
4. *The theory should allow previously unsuspected phenomena to be predicted.*
5. *The theory should be testable through experimentation by anyone else possessing the necessary equipment.*

conducted around the world today. You can break it into five parts.

"First: **Observe phenomena.** For example, notice things such as when you crossbreed red and white flowers that a certain number of the offspring are red, a certain number white, and a certain number pink. Or notice how planets seem to cross the sky relative to the fixed stars. Or note how animals seem to change to adapt to their environment.

"Second: **Construct a theory that explains why these things act the way they do.** A really good theory will be reducible to a few easily understood axioms. One of the most famous theories to emerge in the 20th century is Einstein's restricted Special Theory of Relativity. Relativity rests on just two axioms: (1) the speed of light is constant for all observers, and (2) all motion is relative. Starting from here, Einstein explained a lot of things that puzzled 19th century scientists, including why the speed of light seemed the same to everyone.

"Third: **A really good theory will relate phenomena not previously thought to be related.**"

"In other words," Dave said, "it will be a more encompassing theory."

"That's right. In the 19th century, astronomers noted irregularities in the orbit of Mercury that led them to believe there was an undiscovered planet revolving around the sun inside the orbit of Mercury. But since no planet was detected, it was assumed the planet must lie so close to the sun that it was lost in its glare. Einstein pointed out that such a search would be fruitless because he could explain Mercury's orbital shift, called a precession, with his theory. In fact, he showed that all the planets precess in the same way Mercury does, but since the planets further out move slower in their orbits, the precession was less and hadn't been noticed.

"But the result was that a theory, that is, Einstein's Special Theory of Relativity, that seemed to be only about light precisely explained the precession in the orbits of planets.

"Fourth: **A great theory will predict the existence of heretofore unobserved or unsuspected phenomena,** and Einstein, in his Special Theory of Relativity, explained there was a connection between matter and energy. That's the famous $e=mc^2$ equation and from that comes the atom bomb and nuclear energy. These were things no one else had anticipated. Later on, in 1916, when he published his General Theory of Relativity, he predicted that gravity would 'bend' light, something that apparently hadn't occurred to anyone else up to that time, and sure enough, during a solar eclipse of 1919, astronomers measured the apparent bending of light as it passed near the sun, and the bending was exactly what he predicted."

"So what you're saying is that a theory should do more than just explain the observations and data at hand; it should reveal new information," Dave said.

Mac nodded.

"Fifth: The scientist should **suggest experiments that test the theory**, but more important, the **independent observers should be able to conduct experiments that test the validity of the theory, and the results of the experiment should be reproducible by every experimenter who tries them**. For example, Einstein's theories can be verified by anyone with suitable equipment, and the outcome of those experiments are not, with all due respect to you, Bill, a matter of opinion."

"Isn't that what happened to those guys up in Utah who claimed to have discovered cold fusion?" Dave asked. "They were finally discredited because too many other scientists couldn't duplicate their results."

"That's right. But until the invention of the scientific method, what was the litmus test of a theory?" Mac asked.

No one answered.

"It was whether or not it appealed to reason?' No one said, 'Let's do an experiment and see if it works in the real world'. It was simply: If it sounds good, it must be true.

"And although we now live in the days of modern science, an awful lot of stuff goes around whose only validation is that it fits into that person's political or religious philosophy, and it leads to bad science.

"A case in point comes right from this century. In the old Soviet Union, there was a man named Trofim Lysenko. He claimed biological traits were environmental instead of inherited. This theory fit in with Communist theory because the communists maintained that by changing the political system, the nature of people would change. As a means of demonstration, he claimed that by feeding generations of white mice a steady diet of rice, succeeding generations acquired Oriental traits including the so-called slanty eyes, yellow skin, and even stereotypical Oriental behavior. He also claimed he could change wheat into rye or oats by changing its environment.

"No one in the west could duplicate the results of Lysenko's experiments.

And, in the Soviet Union, biologists who disagreed with the results of his 'experiments' could lose their jobs and many were imprisoned. Some were even shot.

"But in the rest of the world, where science had at least some integrity, because his experiments were not reproducible his theories were ignored.

"And that, my friends, is what science really is. It's not a set of dogmas or beliefs, or facts, or theories. Facts can be mistaken, scientific theories can be overthrown, but the method reveals how the real world works, and in that way it's different from religious and philosophical theories. And that's also my measure of validity and truth.

"The scientific method is no longer just a part of western civilization; it's been embraced by the world—Protestants, Catholics, Jews, and Buddhists; Africans, Asians, Europeans; men and women; anyone who wants to become part of the modern world. They've done this because it works. It's changed the world more than any other idea ever has.

"The shame is that people get a public school education, leave high school, and don't have a clue as to what science is. In fact, I think it would be fair to say that most so-called educated people don't know what it is.

"I think that science teachers in grade school and college should, at the beginning of every semester, write on the board what science is and keep coming back to it as they teach, because even though you may not be able to understand what the Theory of Relativity means, the meaning of the scientific method is within the grasp of everyone, and, at its barest, it's what science is all about.

No one said anything for a moment, so Mac picked up his book again.

But Dave said, "So 'true', from a scientific point of view would be 'can a theory withstand experiment to see if it concurs with reality?'"

Mac looked over his book again. "That's right. That's what experimentation does. And anything that hasn't been tested is open to scientific question, and anything that can't be tested experimentally doesn't fall under the domain of science."

"What wouldn't fall under the domain of science?" Dave asked.

"An example of the kinds of things that no one has been able to subject to scientific experimentation are the existence of black holes in outer space. We're pretty sure they exist, but no one has yet conducted an experiment to show they do—or even could. Another example would be the graviton, which would be the particle that would be responsible for gravity. It probably exists, but no one has shown experimentally that they do.

"On the other hand, an example of something that it may be impossible to demonstrate scientifically is the existence of God. This doesn't mean that God doesn't exist; it means his existence is beyond the reach of science—at least today and perhaps forever."

"The thing that bothers me about science," Tom said, "is that so much of it is based on statistics."

"What's that mean to you?" Mac asked.

"Well, everyone knows statistics are inaccurate and it's so easy to lie with them."

"Mark Twain said, 'There are three kinds of lies: lies, damned lies, and statistics," Mac said.

Tom smiled.

"Tom, statistics is one of the best formulated and most studied branches of mathematics, and it's the only tool that exists for handling large amounts of data from the real world. If there's a better way, with a better track record than statistics has shown, then everyone in science wants to hear what it is. Because of its very nature it can lead to erroneous results, but scientists are aware of this so it's one of the reasons tests are conducted again and again. But because it has been phenomenally successful, it's one of the most powerful tools available to scientists.

"And the fact that people use statistics to lie isn't the fault of statistics. Generally they get away with it because people are so ignorant of statistics."

"So that's it," Dave said. "The scientific method."

"That's it," Mac said.

"Do you think there's intelligent life on other planets?" Dave asked.

"I'm not sure there's intelligent life on this planet," he said.

Tom and I laughed and Mac added, "Actually, I think there probably is—intelligent life on other planets, that is."

"Do you think their science would be far ahead of ours?"

"Some would be more advanced, some wouldn't. But what would be more advanced is their technology and what they've discovered about physics, biology, medicine, and what have you. But I think their method of conducting science would be just like ours. I can't imagine anyone ever coming up with a modification that improves on it. I'm not saying it's impossible. I just doubt it."

"Well, I've got to say I feel a little better about science," Tom said.

"What do you mean?" I asked.

"Well, it doesn't seem as much at odds with religion the way Mac talks about it."

"What do you mean?"

"I'm a religious man, John, and most of the time, when I argue with people who are not religious, they use science to try to bash religion. But, as Mac pointed out, science isn't at war with religion at all. It's just a method for discovering things about the natural world, and I would guess that things which are outside the realm of science, like God, are okay to have as matters of faith."

He looked at Mac and Mac said, "That's the way I'd think of it."

"But there is now a growing problem with modern science," Mac said. It's that what it reveals about the mod-

ern universe is becoming inaccessible to the modern educated man. To understand a lot of it, specifically in physics, you must be a mathematician."

"What do you mean?" Dave asked.

"If you wanted to understand Aristotle's view of the world, all you had to do was read Aristotle. To understand Hume, Kant, Descartes, or the Christian view of reality, you do the same thing. But to understand modern physics, you have to know how to work with calculus, differential equations, abstract algebras, and who knows what else; perhaps even topology and parabolic or hyperbolic geometry."

"You sound as if you're speaking Greek," I said.

"I disagree," Dave said to Mac. "Give me an example of something I can't understand without being a mathematician."

"What happens to time as you approach the speed of light?" Mac asked.

"It slows down."

"Why?"

"What do you mean, 'Why?'"

"What's the mathematics that led Einstein to conclude this?"

Dave didn't respond.

"If you can't answer that, then you have no more than a layman's understanding of why it's so. In fact, it's just an article of faith with you. If another scientist were to announce in tomorrow's news that he's modified or overthrown Einstein's theories, would you be able to follow his reasoning and determine whether or not you agree he's done it?

"If not, you only have a layman's understanding of the theory."

"So what's your point?" Dave asked.

"Your adherence to Einstein isn't much better than the creationist's view of the universe—except for one thing."

"What's that?"

"I was hoping you could tell me."

Dave thought a moment. "Because," he said, "I know Einstein's theory has, at least until now, passed through that meat grinder we call the scientific method and has not been found wanting."

"That's right. You know some scientist—and probably a whole cadre of them—has experimented with it."

"Okay, I see your point," Dave said.

"The success of science as a way of 'knowing' the universe has been staggering when compared to all the competing methods. Science is going to continue to change the way we understand the universe, and it will continue to change the way we live. Science is not going to go away, and those who want to ignore it are simply going to be left out of the best part of the modern world," Mac said.

He picked up his book and continued reading, and Dave and I went back to work. But Tom and Bill got into another conversation. They talked about religion and pretty soon it was an argument.

Mac kept his nose in his book until Tom turned to him and asked, "What do you think, Mac?"

Mac closed his book and stood up.

"Where are you going?" Dave asked.

"Fishing," he mumbled while shaking his head, and with that he picked up his fishing rod and left. Δ

Grandma will love this personal "Helping Hands" wall hanging

By Sally Boulding

Here's a relatively easy gift that you and your child can make together. The instructions here are to make a wall hanging or a lap blanket, but consider the idea also for an apron, throw-pillow, or vest. If it was made by her grandchildren, Grandma will certainly treasure it forever.

Materials:

One yard light colored cotton fabric (We used muslin.)

Fabric paints in squeeze tubes in a variety of colors (We used Tulip brand, which can be purchased at most fabric or craft stores.)

Scissors, pencil, newspaper or paper towels

Method:

Cover work table with paper towels or newspaper to prevent paint from damaging the work surface.

Lay a half yard of fabric out on the table. Save the remainder as backing for wall hanging.

Fabric-paint the title "Grandma's Helping Hands" on the top portion. Have children place their hands on the fabric and draw around each hand lightly with a pencil. Leave at least a half inch on all edges for finishing.

Use your imagination to color in and outline the hands. Remember to label each hand with the child's name. If you include birth dates or a special message to Grandma, they should be added at this time.

Finishing:

Simple finish: Fold under 1/4" twice and sew. Add a lace or ribbon trim if desired.

Quilted finish: Lay out remaining half yard of fabric. Cover wrong side with a single layer of quilt batting. Baste. Turn over and pin right side of design to right side of lining fabric (not the batting side). Sew around three sides, turn. Press edges smooth. Turn in unfinished side and pin. Topstitch around all four sides. Hand- or machine-quilt around the hands. Add loops for hanging. Δ

Author and son, Joshua, age 10, paint grandma's wall hanging.

Grandma Kathy Myers shows off her wall hanging with the help of her grandchildren, from left, Robby, Sammy, and Jacob Duffy.

The holier-than-thou activists who blame the population for not spending more money on their personal crusades are worse than aggravating. They encourage the repudiation of personal responsibility by spreading the lie that support of a government program fulfills individual moral duty.

Patrick Cox
USA Today
(from Ain't Nobody's Business if You Do by Peter McWilliams)

We are all tolerant enough of those who do not afree with us, provided only they are sufficiently miserable.

David Grayson
(from Ain't Nobody's Business if You Do by Peter McWilliams)

Yesterday's furniture today—a puncheon bench

By Dana Martin Batory

Searching for another use for those discarded slab boards from a friend's sawmill or your own, other than feeding them to your stove? Then try your hand at making a few of them into puncheon furniture.

What is a puncheon? Nothing fancy, just a split or sawn log or a heavy wooden slab with a smoothed surface. Naturally, puncheons quickly found an important place in pioneer homesteads as the tops of stools, tables, benches, etc. Even as floors. The raw frontier was no place for fancy cabinetry or skilled joiners.

This rustic, rough-and-ready furniture has maintained a widespread popularity, popping up in gardens, weekend cabins, cottages, etc. Those waste slabs, when joined with the wide selection of hand and power tools not available to the frontiersman, make a good after-work or weekend project.

Instructions

Choose a sound slab board 1 to 2 feet long (or longer if preferred), 9 to 12 inches wide, and at least 2 inches thick with an attractive grain—any hardwood will do. I tend towards cherry. Dimensions will vary of course since each slab is different as well as each woodworker's taste.

The bark can be peeled off and the exposed wood sanded with a flap wheel or wire brushed (sand blasting will also work). I prefer to retain the bark since it makes a wonderful contrast. All mud, dirt, stones, loose bark, etc. must be removed with a stiff broom (or power sprayer) to protect tools.

Prepare one straight edge with a hand plane or jointer. The other edge can then be ripped parallel or left as is. Cut to proper length and at a right angle to the straight edge. Use a belt sander or hand plane to dress the surface as level and smooth as possible. I'm more fortunate than most. I used my restored J. A. Fay & Egan 16-inch jointer for this task, followed by a light hand sanding. Put three coats of varnish on top, sides, and ends—sanding between coats. Varnish the bark also but do not sand.

A finished puncheon bench. The top and legs are walnut.

A hole must be drilled in each corner at an 80-degree angle for the legs. Because they are drilled from the curved side measuring is difficult. I use a simple template—a 3-inch square of paper. Line up one corner of the paper with the bench corner and curl the paper over. Using an ice pick or an awl, mark a starting hole at the extreme inside corner. Use a 1-inch spade bit or Forstner bit and drill the holes 1 1/4-inch deep. Tilt the drill press table right 80 degrees and drill the proper two opposite corners. Tilt the table left 80 degrees and drill the remaining two. The holes can also be drilled by hand. Just lay out your angles on the bench ends and sight along these while drilling.

The author surfaces a cherry slab board on his antique 16-inch jointer.

Saw the legs to the correct length and turn to the given diameter—socket end at lathe headstock. Taper the socket end slightly to leave room for the glue. Any hardwood, such as hickory, will work for the legs. They can be turned from commercial stock or from billets cut from the woods. Dowel rods will also work. Test the legs for fit, and correct if necessary.

Varnish the legs (except the top 1" 1/4-inch) three times, sanding between coats. Apply glue to the holes and tap legs into place until they bottom out. Wipe off the excess glue with a damp cloth.

After the glue has set turn the bench upright and check for level. If needed, sand leg bottoms to bring into alignment. Finish off with a coat of paste wax. Δ

Drip irrigation saves a lot of water and weeding

By William Gettys

Drip, drip, drip. That's no leaky faucet. I'm watering the many different plants on my property—and saving water while doing it. Water consumption is 30 to 40% less than with conventional methods of irrigation, and there are fewer weeds, because drip irrigation doesn't water the area between plants. Water is applied at a slow rate, so there is less surface water build-up, and plants experience less stress because the variations in soil moisture are evened out. Flexible tubing is used to distribute water to the emitters, sprayers, and soakers.

One big advantage of a drip setup is its flexibility. When your water requirements change, it is a simple matter to add more line or drippers, or even remove them completely. I have recently added more emitters to the orchard, to accommodate the larger root systems of the growing trees.

With all these advantages, it's hard not to be enthusiastic about drip irrgation, so let's make a shopping list:

1. Tubing

The main tubing used in drip setups is **polyethylene tubing**. It is available in 1/2" or 3/8" diameters. Easy to cut with pruning shears, this tubing is the most convenient to use.

Laser soaker hose in the vegetable garden

Schedule 40 polyvinyl chloride pipes —**PVC**—may be used with the polyethylene to form less flexible but more permanent hybrid-type setups. In one small eight-tree orchard, I wanted to bury the tubing, but thirsty gophers chewed holes in it. I ran PVC pipe to each tree in a trench, attached standard hose couplers to the ends of the drip tubing J-loop and PVC pipe, connected the two and, voilà, no more gopher problems.

Micro-tubing is small in diameter. This spaghetti-like tubing is used for placing emitters beyond the reach of the main lines.

2. Emitters

Emitters come in a myriad of shapes and types. Some are *pressure compensating*, that is, they even out the output during water pressure changes. I have found little practical difference between compensating and non-compensating types unless there is a difference of 10 to 15 feet in elevation between sections of the setup. Some experts, however, feel the extra cost of pressure compensating emitters is justified by the added ability to obtain uniform flow rates at varying water pressures.

Mini sprinklers are good for watering low-growing ground cover.

Water output is expressed as gallons per hour—**GPH**—as opposed to the gallons per minute measure of standard sprinkler and bubbler systems. Emitters are rated for one-half-, one-, two- and four-gallons-per-hour output, and are color coded red, blue or black, and green respectively.

Emitters are also available *in-line*. That is, they are built into the polyethylene tubing. These **soakers**, as they are sometimes called, are useful for vegetable or flower bed gardens where you want a large area to be watered by evenly spaced emitters. Soakers are also available as tubing with laser-drilled holes spaced six or twelve inches apart.

Mini-sprinklers use more water—six to twenty-four gallons per hour—and dispense it over a greater area than emitters, but they still use much less water than standard sprinklers. These are useful for low-growing ground covers such as succulents. Some orchardists place half-diameter sprinkler heads on each side of the tree trunk to cover the entire root zone. To avoid damage to the tree, be sure water does not spray directly on the trunk.

A double J-loop provides even water distribution to larger trees.

3. The hole punch

Don't forget this little device, which is used to make holes in the tubing before inserting emitters.

4. Hose fittings

Hose fittings are used to piece your system together, much like putting together Tinkertoys. You simply push the tubing into the fitting. One type made by Hardie Irrigation secures the polyethylene hose to a raised barb by using a plastic ring.

Attach the tubing to the main faucet with a female hose swivel. Couplers, elbows, and tees are used to piece various sections of hose together. The end of the hose is closed off with an end clamp.

5. Anti-siphon

Even if you feel unfettered by county health codes, it is a good idea to install an anti-siphon device. This will protect your household water supply from accidental back flow when main line water pressure dips.

6. Filter

The first line of defense against the frustration of clogged emitters is the filter. All water systems contain impurities to some degree, and a filter will save both the emitters and your sanity.

7. Pressure regulator

The pressure regulator reduces your high household water pressure to the 15 to 30 psi (pounds per square inch) required by the drip system. Some who try to skimp on this device often find their emitters popping out of the tubing.

Planning your system

Now it's time to plan your system. Decide what the water source will be. The simplest method is to attach the system to a garden hose faucet or an existing sprinkler manifold. Make a sketch of the area to be served and calculate the length of hose you need. If you have areas of plants with very different water needs, put them on separate systems. As a rule of thumb, don't extend the pipe more than 350 feet or so. (I cheated a little on the length on one of my systems, but I had to increase watering time.)

Determine the kinds and numbers of emitters. Another rule of thumb: don't put more than 350 one-gallon emitters on one line. The kind of soil you have will determine the kind of emitter you will use. Clay soil will require half-gallon emitters. Use one-gallon emitters for loam soil, and two-gallon for sand. If you can't decide your soil type, it is probably safe to assume it's normal loam and use one-gallon emitters. I have nine separate drip systems on my five acres, and most of the emitters are the one-gallon variety.

For trees, use a loop of line in the shape of a J placed about half the distance between the trunk and the drip line. I feel there is more even distribution over the entire root zone if a double J-loop system is installed as my trees get larger. To use this system, place the first J-loop no closer than two feet from the trunk, and the other almost to the drip line of the tree. If the tree is on a slope, place most of the emitters on the uphill side of the tree. Gravity will cause the water to flow evenly around the roots.

Laying the line

For vegetable gardens, the simplest way to water is to use soaker hose. I'm using 1/4" diameter laser tubing. Holes drilled by a laser dispense one GPH each, and are spaced every six or twelve inches. It is a simple matter to lay out the tubing along the vegetable rows. I can't recommend this tubing for permanent flower beds and ground covers, however. Over time the holes will get plugged and will require cleaning, a chore best left for the temporary vegetable beds. Regular emitters are much more resistant to plugging, and should give years of trouble-free use. If one does get plugged up, simply insert another one beside it.

In flower gardens and areas of ground cover where the plants are

A drip system can be connected to a garden faucet.

Watering chart

Courtesy of University of California Agriculture Extension
This is a general guide. Times will vary depending on soil type and season.

Type of plant	Time (hrs)	Interval (days)	Flow (GPH)	No. of emitters	Placement of emitters
Low shrubs (2-3')	3	2	1	1	At plant
Shrubs & trees (3-5')	2	2	1	2	6-12" on either side
Shrubs & trees (6-10')	2	3	2	2-3	2' from tree, equally spaced
Shrubs & trees (11-20')	2.5	3	2	3-4	3' apart, equally spaced
Shrubs & trees (21' +)	3	3	2	6+	At plant
Flower beds	1	2	1	1	At plant
Ground covers	1	2	1	1	At plant
Vegetables (close spacing)	1	2	1	2	Every 16"
Vegetables (wide spacing)	1.5	2	1-2	1	At plant
Potted plants: 1 gal.	1/6	1	1	1 per plant	At plant
5 gal.	1/3	1	1	1 per plant	At plant
25 gal.	1.5	2	1	1 per plant	At plant

spaced closer than two feet, it is best to space emitters every two feet because the roots of the plants will cover the entire garden area, anyway. For all other plantings, place emitters at the plant. You can run micro-tubing to the plants from the main drip line.

After laying out the tubing, flush it for a few minutes to remove bits of plastic and other impurities that might plug emitters. Then plug the end of the line with an end clamp. Leave the water on at low pressure while inserting emitters. Push the hole punch into the tubing while gently squeezing the tubing. Water will spurt out, getting rid of the plastic plug. Then push in the emitter.

The line will be easier to work with if left in the sun for half an hour to soften. If the compression couplers are hard to push onto the tubing, put the end of the tubing into a cup of hot water to soften.

How much water?

There are complicated formulas to determine how much to water each plant. These formulas are available at local agricultural offices. A simpler method is to wait a day after watering, then poke a long screwdriver, a stiff wire, or a piece of re-bar into the ground. Insert it until you reach resistance—that is the depth of moist soil. If the soil is not moist enough, increase the watering cycle until it reaches the moisture content you want. At different times of the season you will, of course, have to adjust watering times.

You can also control drip lines with an automatic timer system.

Maintenance

Maintenance consists of monitoring your system occasionally to check for broken emitters or cracked tubing. Once a month, clean the filters. Periodically remove the end caps and flush out the lines for a few minutes to remove accumulated sediments. Check on your plants as they grow and make sure they are getting enough water. Remember, over-watering is just as harmful to plants as watering too little.

Over time, you may accumulate several separate drip systems, and automating watering cycles will become more appealing. Be sure to obtain a timer which allows watering periods to be scheduled in hours. Units are available for use at the hose faucet, as well as those that operate the standard control valves used with standard sprinkler systems. Timers operate at 24 volts, and battery-operated units are available.

With all the advantages of drip irrigation, why not get started now? Start with a small area of your landscape. You can always add to the system later—and you probably will. Δ

Build a "solar powered" clock — it's fun, educational, and even useful

By Carl Bussjaeger

Here's a good way to have some celestial summer fun, and it doesn't involve watching the Hale-Bopp comet or southern Californians shedding their earth containers. How about learning to tell time with a solar clock? This article will show you how to build one.

Solar clocks—or sundials—are just plain fun to use, not to mention to build. And if you are homeschooling, turning your child loose with these instructions and some cardboard may be a fun way to teach a few of the basics of longitude and latitude. He'll also learn a bit about geometry. And, of course, it is a nice introduction to telling time for youngsters.

Let's start by defining a few terms.

Sundial—A device for determining time of day by observing the changing length or direction of the shadow cast by a fixed object.

Face—The surface of a sundial where the shadow falls. As a minimum, it has some type of graduated markings to indicate time, and often includes ornamentation and mottoes.

Gnomon- The fixed, shadow-casting portion of a sundial.

Style- The edge of the gnomon which casts the part of the shadow that determines time. Often used synonymously with gnomon.

Latitude- Distance from the equator as measured in degrees. On a globe, latitude is represented by the horizontal lines.

Longitude- Distance from the prime (0) meridian as measured in degrees. On a globe, longitude is represented by the vertical lines running from pole to pole.

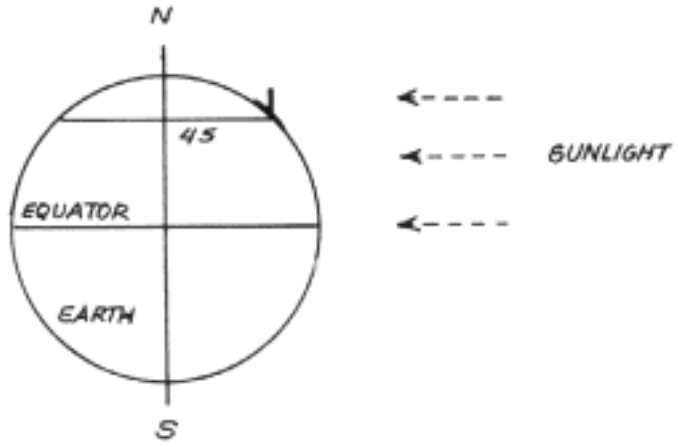


Figure 1. Aligning the style parallel to the earth's axis (dial at 45 degrees latitude)

General

In the following descriptions, the style on the sundial is always set at a certain angle determined by latitude. The reason for this is so the style will always be parallel with the earth's axis. Thus, the sun hits it squarely. A quick look at Figure 1 will demonstrate this.

This also shows why the style points north. Therefore, it is very important to know where true north is. This can be determined with a compass; but since magnetic north does not necessarily coincide with true north, you must know the angle of declination (compensation for true north) for your location.

If no compass is available, or if declination baffles you, despair not.

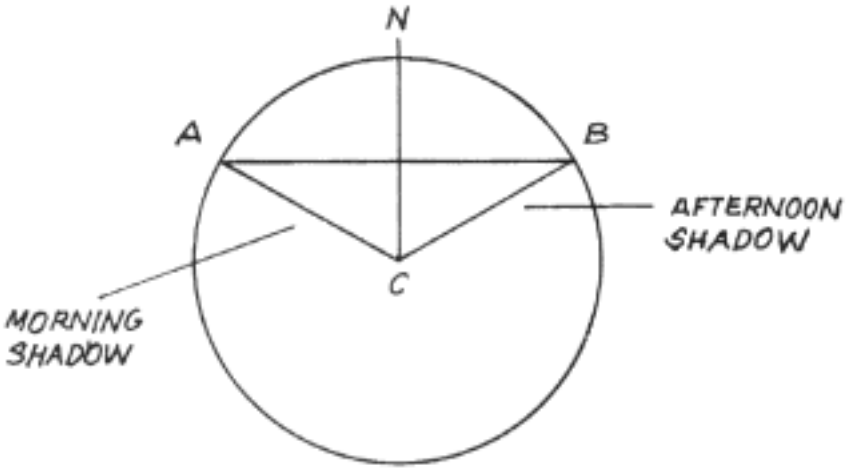


Figure 2. Finding true north

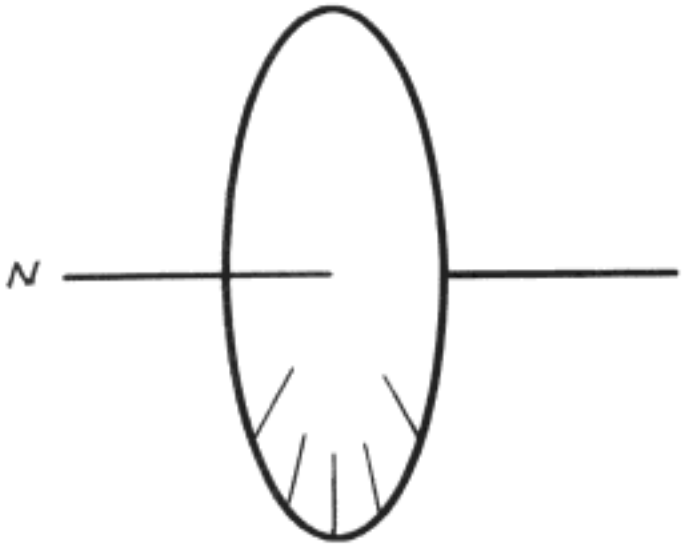


Figure 3. Equatorial sundial

Finding True North. On a level surface, draw a large circle. Set up a vertical rod at the center of the circle. On a sunny morning, watch the rod's shadow until the end of the shadow exactly touches the circle. Mark that point on the circle (A). In the afternoon of the same day, watch for the tip of the shadow to touch the circle again. Mark that point (B). Draw a line between the two points you have marked.

Now divide that line exactly in half with another line drawn from the center of the circle. This last line points to true north as in Figure 2.

Latitude and Longitude

Now, you know where north is. But where are you? You must know your latitude so you can properly orient the style on your sundial. Since relatively few people have the skills or the equipment to read their latitude from the sun (I certainly don't), or can afford LORAN receivers, cheat. Go to the library and look up your latitude on a U.S. Geological Survey map for your area. And while you're at it, scribble down your longitude as well. That information comes in handy later.

There are several different types of sundials you could build. I'll describe a few and leave it to you to decide which suits you.

The equatorial sundial

The equatorial sundial is one of the simplest of the dials. Take a long straight rod, stick it in the ground pointing north, and impale a circle on it. Mark the top of the face with evenly spaced hour marks. There you have it. The equatorial dial gets its name from the fact that, when properly aligned, the plane of the dial face is parallel with the equator as in Figure 3. It's done like this.

Face: Draw a circle. Starting with 0 degrees at the desired noon position, make hash marks on the circle at 15 degree intervals. Each 15 degrees indicates one hour. Half hour marks at 7.5 degree intervals, and quarter hour marks at 3.75 degree intervals, may also be added.

Style: The style is a straight rod set at the center of the circle, perpendicular to the face.

Alignment: The equatorial dial must be positioned so that the dial face is parallel with the plane of the equator and the style points north while elevated from the horizontal at an angle equal to your latitude. See Figure 4.

Problems: As the dial plane is parallel to the equator, the sun rises high enough to cast a shadow on top of the dial from only March to September. To make the dial useful for the rest of the year, mark the underside as well as the top. Unfortunately, for easy reading, this means the dial must be rather large. I've seen sundials of this type with faces as large as 8 feet across.

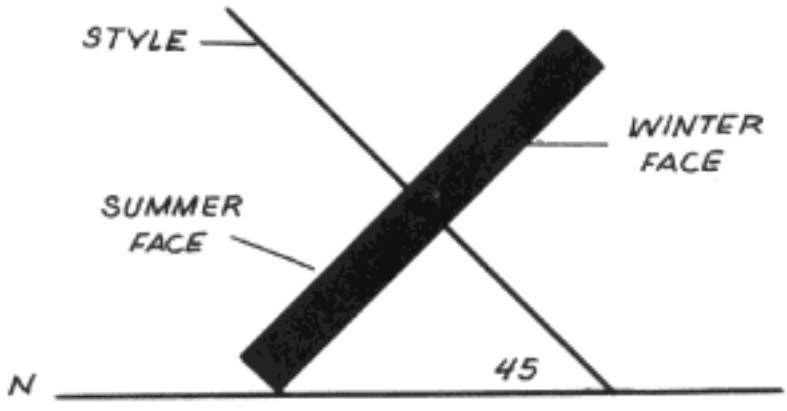


Figure 4. Equatorial dial aligned for 45 degrees latitude

Also, if your dial face is circular, your dial will have a tendency to roll around. You can get around this by making the bottom of the face a straight edge.

The polar plane dial

The polar plane dial is nearly as easy as the equatorial. This dial can be little more than a rectangle tipped to the north, and divided in the middle with a thin wall. See Figure 5.

With this dial, both the dial face and style are parallel to the earth's axis; hence the name.

Face: The dial is a plane aligned from east to west and tilted to the north at an angle equal to your latitude.

Style: The style is a plane rising perpendicularly from he dial face. It should be as long as the dial is wide, as in Figure 6.

Hour Marks: As in the equatorial sundial, the hour marks are made at 15 degree intervals. The marks will not be equidistant, however. The spacing will depend on the height of the style.

Line AB in Figure 7 represents the dial plane (face). Line CD represents the style. It must be the exact length of the actual style you will use. Beginning at point B, lay out a series of lines at 15-degree intervals. Where each line intersects line AB, make a mark. These are the hour marks. Half and quarter hour marks may be determined using 7.5 and 3.75 degree intervals, as before.

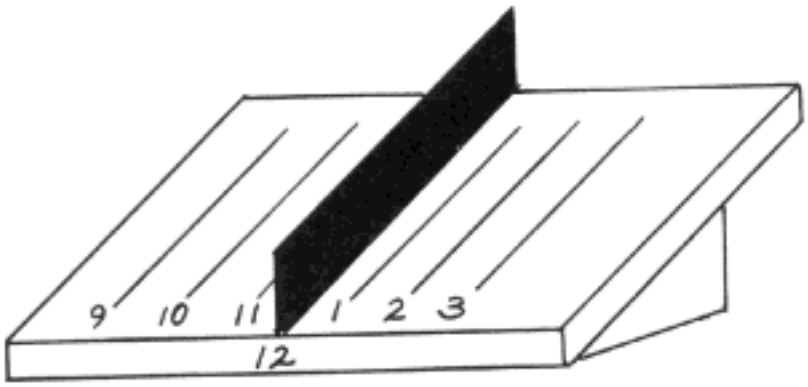


Figure 5. Polar plane sundial

The horizontal dial

The horizontal sundial shown in Figure 8 is the flat sundial with the angled style that many people imagine when they think of sundials.

Face: Marking the hours on a horizontal dial face is a little more involved than with the equatorial or polar plane dials.

Start with horizontal and vertical lines intersecting at point Y as in Figure 9. On the vertical line, at a convenient distance below Y, mark point Z. Line YZ will be the north-pointing noon line. Create angle YZW, which will equal your latitude (This angle can be thought oµf as representing the gnomon). Now create right (90 degree) angle YVZ. Draw a circle with the center (X) on the vertical line. The radius of the circle must equal the length of line YV (That is, the circle is twice as wide in diameter as line YV is long). Divide this circle into 15-degree arcs (I'll bet you knew 15 degrees would come into this eventually) with lines drawn from point X to your horizontal line. Mark these intersection points on the horizontal line A, B, C, and D. Draw lines from these points to point Z. These lines are the morning hour marks for the face of your sundial. The afternoon lines may be created the same way, or you can simply measure the intervals between the morning points and draw a mirror image of the morning lines.

Again, half and quarter hour lines can be determined using 7.5 and 3.75 degrees, respectively.

Style: As can be seen from the above description, the style angle equal to your latitude, and pointing north (Is this starting to sound familiar?). It should be aligned on the north-south noon line on the face.

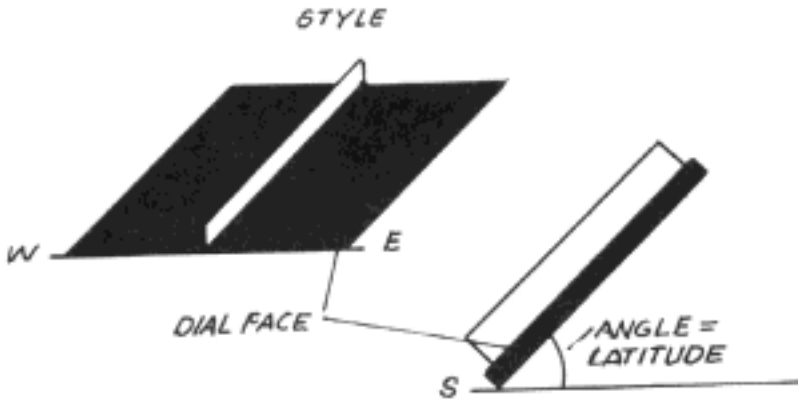


Figure 6. Alignment of a polar plane dial

South facing vertical dial

This sundial, shown in Figure 10, is remarkably similar to the horizontal

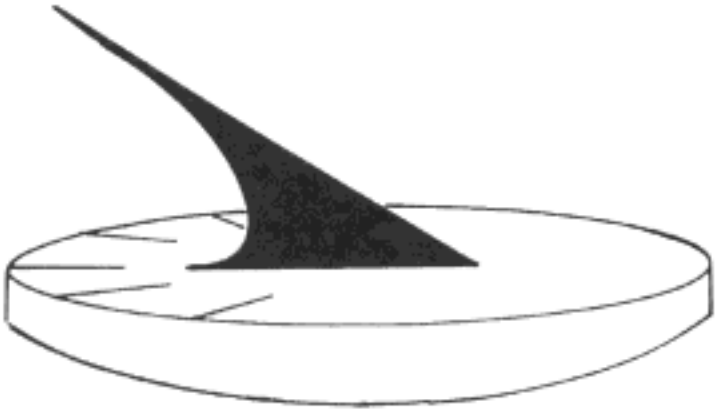


Figure 7. Creating the time marks for a polar plane sundial

dial except that it is mounted vertically on a south facing wall.

Here's how it's made.

Face: Follow the same procedure used for horizontal dials, except that angle YZW is equal to your co-latitude. Co-latitude is found by subtracting latitude from 90 degrees. For example; if your latitude is 30 degrees, then your co-latitude is 60 degrees.

Style: This time the style is at an angle from the vertical equal to your co-latitude, aligned on the noon line, and pointing down.

While vertical dials which face in virtually any direction can be made, their usefulness is limited in that they will be illuminated only at certain times of the day or year. So face it to the south for the best effect.

Construction Tips:

Obviously, for the sake of accuracy, you want to be quite careful when making measurements. When making the hour marks, remember that fine, precise lines are easier to tell time from than thick, precise lines.

If a very thick gnomon is used it can throw off the accuracy of the sundial. Try to keep it thin. If you cannot, remember to base your angle on the closest edge of the gnomon when preparing the hour marks as shown in Figure 11.

What time is it really?

You now know how to build a sundial that tells local time quite well. But local time is based on noon being when the sun is directly overhead. With modern standard time noon for an entire time zone is based on noon at a particular longitude; not necessarily yours.

Don't panic. You can make a sundial read standard time. First, find out what longitude standard time is based on in your time zone. Heck, let's cheat. I'll tell you.

Zone	Longitude
Atlantic	60 degrees
Eastern	75 degrees
Central	90 degrees
Mountain	105 degrees
Pacific	120 degrees

Notice the 15 degree intervals. Look familiar? Multiply 15 degrees by 24, which just happens to be the number of hours in a day. You get 360 degrees; which is the total arc of a circle—which is all the way around the Earth. Now you can see why we've been using 15 degrees all this time.

Okay, moving right along. Dig out your local longitude (You did scribble it down, didn't you?). Now, find the difference, in degrees, between your longitude and that on which your time zone is based. For example; Macon, Georgia is located at approximately longitude 84 degrees west. Being in the eastern time zone (75 degrees), the difference is 9 degrees west.

If you are putting together an equatorial sundial, you need to shift all your time marks by that many degrees. If you live to the west of the time zone base longitude, shift the marks to the east (or clockwise). If you live to the east of the base longitude, shift your marks to the west (or counterclockwise).

For polar plane, horizontal, and vertical sundials the compensation is not made in the time marks themselves, but in the 15 degree angles the marks were figured from. For instance, in figure 7, when measuring the 15 degree angles from line CD, shift them all by the required number of degrees.

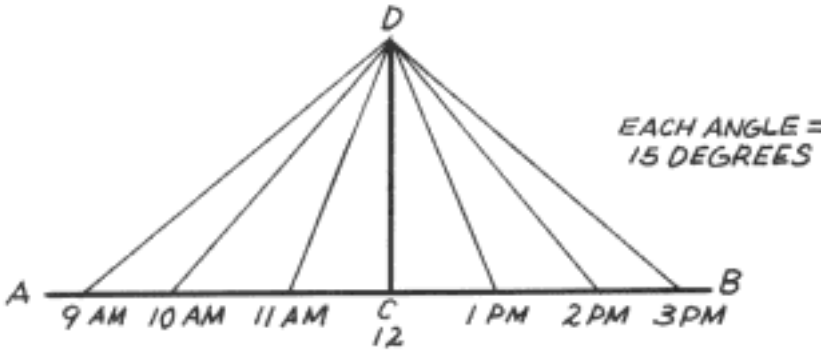


Figure 8. Horizontal sundial

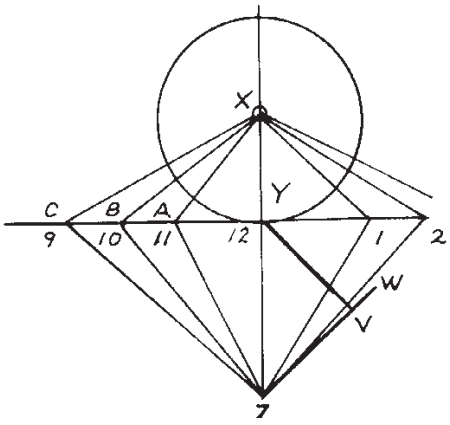


Figure 9. Creating time marks for a horizontal sundial

Simple, eh?

Making adjustments

Finally, your sundial reads standard time. Whaddaya mean we're on daylight saving time, now?

No problem. Make another sundial. Or you might consider some type of movable hour labeling for the fixed time marks. For a circular equatorial sundial this could be a rotatable outer ring with the numbers on it. For polar plane, horizontal, and vertical sundials you will probably have to settle for labeling each hour mark twice. Once each for standard time and daylight saving time.

But I want to take my sundial to events at different places.

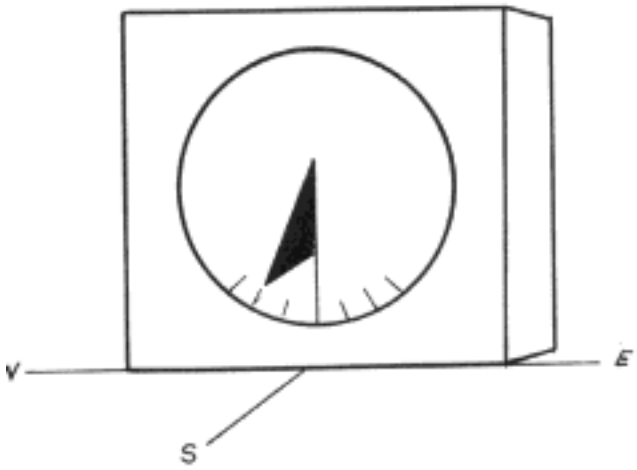


Figure 10. Vertical sundial mounted on a south-facing wall

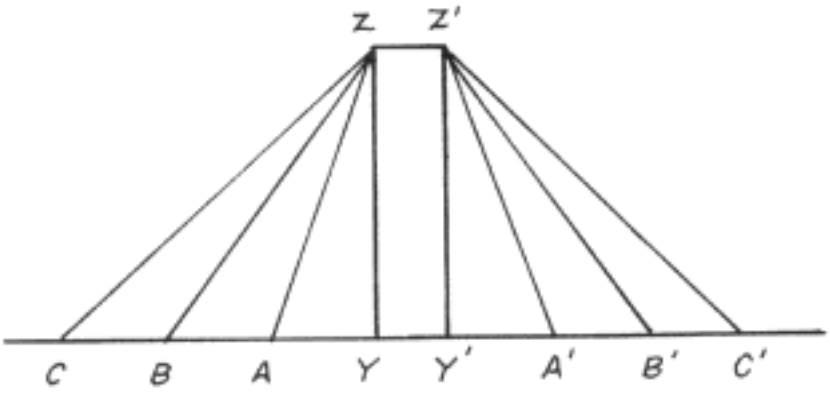


Figure 11. Creating time marks based on a very thick gnomon

We can make it happen. Two things are needed; some way to offset for latitude and longitude shifts. Latitude shifts are easy. For equatorial and polar plane dials all you need is a face mount that will allow you to vary the face's angle from horizontal. For horizontal and vertical dials, the angle of the gnomon must be variable (hmm, could the gnomon be a straight-edge mounted to a base with a thumb screw?).

Changes in longitude are just about as simple. For equatorial, horizontal, and vertical dials make your time marks on a circle that will pivot about its center so that you can offset the marks in the same way that you shifted the marks to make your dial read standard time. On a polar plane dial you will need a sliding bar for the time marks, rather than a rotating circle.

The actual mechanics of construction I leave to your imagination and creativity, along with the question of ornamentation.

Whaddaya mean the sun's down now? I don't know; hmm, maybe candles with incremented bands of color... Δ

Collect (almost) free money by gathering readily available wild plants & botanicals

By Rev. J.D. Hooker

Many of *BHM's* readers have already developed at least a minimal level of interest in herbal medicines. Quite a few probably already know how plantain leaves provide ideal anti-infective bandages for minor cuts, scrapes, and abrasions, how jewelweed helps clear-up poison ivy, and how dried and powdered yarrow provides an excellent infection-preventing "blood stop powder."

Many also know that by filling a canning jar with fresh mullein flowers, adding as much mineral oil as you can fit, then allowing the mixture to sit for a couple of weeks before straining out the flowers and setting aside the liquid, you can produce the finest obtainable pain-relieving children's ear drops.

Even though you may never have tried this for yourself, it's even possible to tan leather using simple plant products, like sumac galls, oak tree bark, and alfalfa leaves.

So it may not come as a surprise to hear that many of these same wild plants that prove so valuable for everything from curing a headache to preventing malaria are eagerly sought after by cash-paying purchasers. In fact, sometimes it's sort of difficult to even believe the tremendous variety of commonly encountered wild plants and rough weeds that people are actually eager to pay for.

One elderly couple I visit pretty frequently brought in $3,000 of extra income last year, just from collecting sassafras leaves. The U.S demand for the roots and bark of this tree have dropped off lately, but in much of Russia, eastern Europe, and Siberia, the leaves from the sassafras tree are very highly esteemed as a thickening agent for use in stews, gravies, and so forth. This demand drives up the prices that companies here in America are willing to pay for this unremarkable item.

Still, sassafras is only the tip of the iceberg where this couple's "retirement income" is concerned. While I can personally guarantee that neither of them ever works very hard, and only when they feel like doing so (I guess that's what retirement's supposed to be about), simply by knowing where and when to market so many varieties of wild plant products enables them to reap a higher income than many folks get from full time employment.

While it isn't difficult for someone to learn how to supply themselves with a steady, reliable, and sizable income using these same methods, it's imperative to remember not to get so greedy as to over harvest these wild botanicals. Though many marketable plants are so tremendously abundant that this caution can be disregarded, many others are becoming scarce, even endangered in certain areas because of over-zealous collecting.

Even here in Indiana, the state has placed open and closed seasons on ginseng collecting because of heavy harvesting pressures. Many other areas have enacted similar rules for the same reasons. Use a little common sense and discrimination and you can supply yourself with a nice part-time income for the rest of your life marketing wild plants. But, if you don't leave some to reproduce, you'll very quickly put yourself completely out of business, and just possibly run afoul of the law as well.

Remember to obtain permission before collecting on private property as well. Though I've found very few land owners who didn't readily permit this sort of activity, these same folks will usually get down right belligerent over unauthorized trespassing. Just be polite and friendly when you ask, remember to keep gates closed, and so forth, and you should have few problems in this regard.

On most state or federally owned lands, asking for permission to harvest such plants isn't usually required. However, it seems as if on ever-increasing portions of our public domain, removing anything at all is no longer permissible. So, it's best to check ahead of time and learn whether such collecting activities are still permitted on the public land you're interested in.

Equipment

There really isn't much of anything you'll need in the way of equipment. The majority of herb and botanical harvesters never use anything more than a strong stick that's been sharpened to a chisel-like point, along with a gunny sack or two. In most cases, anything more would just be in the way.

In my own gathering endeavors, I almost always tote along a firearm and often a small collapsible spin-fishing outfit. Our portion of the map is well dotted with small lakes and ponds, and the spinning tackle frequently accounts for lunch while I'm out.

The firearm, on the other hand, can usually be counted on for some sort of crop raiding varmint or fresh game on every outing. At times I think that it's really only been the superb accuracy of my "bean field" rifle that's gained me such easy access to so many farmlands in our area. It doesn't matter whether you call them woodchucks, groundhogs, chucks, or whatever, these burrowing animals have cost America's farmers so much in lost crops—as well as cattle, horses, and even dogs with broken legs and other injuries—that once the farmers in your area learn that you happen to be a competent and careful shot willing to eliminate even a few of these grief causing pests, you'll usually find a warm reception almost any place you go.

Of course, the fact that the chuck's hide is worth a little extra money (plus the properly prepared meat being mighty toothsome), makes it easy enough to earn such a welcome.

Identifying plants

Should you have an interest in gathering up some of nature's free dollars for yourself, you'll also be needing some ready means of identifying the plants you'd be seeking after. I've found A.R. Harding's Ginseng and other Medicinal Plants and the Peterson's Guides plenty helpful. Still, I think you'd find some of the free or inexpensive identification guides available from the buyers of these plants more valuable, at least to start out with.

Of course, it won't do you much good to gather up even large quantities of the highest dollar roots and herbs until you have a good idea of where you're going to sell them. So I've provided a listing of ready markets at the end of this article. At one time or another I've done business with each of the buyers mentioned and all have proven to be honest, reputable, fair, and even helpful. But you need to realize that each caters to a somewhat different final market, so you'll very frequently find some major differences in what each is willing to pay for any particular item.

Keep in mind, as well, that as these same final markets change and fluctuate, so their purchasing prices can often jump up or down without much warning. I've found it best to stay in contact with each buyer and to stay up to date on current pricings and "wants lists" to ensure receiving the best price for each different item.

Just as long as we'll each harvest nature's bounty in a responsible and respectable manner, there should always be plenty of "free" money growing in our woods and fields just there for the picking.

Markets

Ohio River Ginseng and Fur Inc.
P.O. Box 2347 (SR 267), East Liverpool, OH 43920
(216) 385 -1832
BUYS: raw furs, and some botanicals

Turley's Ginseng and Botanical Co.
Rt. 1, Greenville, IL 62246
(618) 664-2871
BUYS: herbs and botanicals

Mallow Fur Company
601 Asbury Rd., Clarksburg, OH 43115, (614) 495-5681
BUYS: raw furs and ginseng

Mepps
626 Center St., Dept. 323, Antigo, WI 54409-2496
BUYS:squirrel and deer tails, etc.

Potter Fur & Roots Inc.
2883 Cook Rd., Rootstown OH, 44272
BUYS: lots of differing herbs, furs, botanicals, etc; buys more items than most others.

Wilcox Natural Products
P.O. Box 391, Boone NC 28607
BUYS: herbs

JLF Raw Researchables
1625 Gladstone Ave., Columbus, IN 47201
BUYS: weird poisonous stuff; write for current list

Hershey's International Inc.
8210 Carlisle Pike, York Springs, PA 17372
(717) 528-4495 or 528-8316
BUYS: herbs and botanicals

Hsu's Ginseng Enterprises
P.O. Box 509, Wausau, WI 54402
BUYS: herbs and botanicals

Tac-A-Wah Herb Co.
4252 TR 628, Millersburg OH 44654
BUYS: herbs and botanicals

Star Mountain
1431 South 4th St., Allentown, PA 18013
(610) 797-9036
BUYS: herbs and botanicals

White Crane Trading
447 Tenth Ave., New York, NY 10001 (212) 736-1467
BUYS: herbs, furs, feathers, etc.

American Botanicals
1610 W. Allen, Bloomington IN 47403
(812) 336-7590
BUYS: herbs and botanicals

Roots " O " Gold
Box 92, LeCenter MN 56057
(612) 665-6310
BUYS: usually only ginseng and goldenseal

Madisons
Box 116, 660 Water St., Conneaut Lake, PA 16316
(814) 382-2501
BUYS: herbs and botanicals

Northern Maps
Box 129, Dunnelon FL 34430
SELLS: old county, railroad, state and other maps. Often very useful in finding old roads, right of ways, etc., for collecting and travelling. Δ

Heat your household from the outside

By Jacqueline Tresl

In our rugged days, when we were young and tireless, we kept warm with a big wood stove plunked down in the center of the house. For baths and dishwashing, we heated our hot water outside with wood. Every evening after supper, one of us filled the old hot water tank with a garden hose and built a fire under it. An hour later we had hot water, which we gravity fed into the bathtub or washing machine through a second garden hose.

For 11 years we lived that way. In the winter, we hauled in wet, snow-covered wood twice a week, stacking it beside the stove, watching as the mud and muck dribbled off the firewood on the floor. Every morning (and sometimes every evening) I dusted off the soot and wood stove dust that accumulated on the furniture tops. Returning home after a lengthy trip to town, the house temperature hovered near 40 degrees. Then we waited for an hour and shivered while the house ever so gradually warmed up. Our method of heating was a labor of love.

Heating hot water outside was nifty in the summertime (except when it was rainy or I had five loads of laundry to do and three dozen quarts of beans to can and the hot water tank needed to be refilled and refueled six times in one afternoon). But making hot water outside in the winter was trying. The hoses that filled and emptied the tank began to freeze overnight as early as December. They had to be drained and lugged inside every night. When afternoon temperatures never got above 20 degrees, the fire to heat the water had to be huge. The fires we built on the really cold days were so big it looked like we were trying to launch the tank into outer space.

Sometimes it was pretty tough. But we refused to be slaves to the utility companies. We have always restricted ourselves to using no more than 250 kilowatts of electricity per month. We didn't have natural gas readily accessible. We didn't want the hassle of propane tanks. Solar power gives out

The stove sets on a concrete pad in a small shed. The trench connects it to the barn. The shed make it nicer when filling the stove in bad weather.

here by November. We stuck with our labor-intensive heating method, hoping eventually to find an economical and effective alternative.

My husband Mark grew up in Europe and, for years, talked about the outside wood stoves the Nordic people used when he was a little boy. The concept seemed silly to me. Why make all that heat outside when it's needed inside? How is the heat brought into the house? Isn't having to load a stove outside a pain in the neck?

Mark refused to be swayed by my concerns and was always on the lookout for an outside heating system that used a European design and was affordable. Most systems he looked at cost a fortune. All were made from cast iron and would eventually rust out. Some systems offered ways of heating domestic hot water, but their design was overly complicated.

One day, out of the blue, Mark found the stove for us. It is a woodstove that sits outside, positioned 10 to 100 feet from the building it will be heating. It can provide heat to one or two buildings, depending on the size and the square footage of the buildings. Once installed, it would supply an unlimited amount of 180 degree water for household use. During average winter months, it uses less than 50 kilowatts of electricity to operate.

Our stove came with a copper coil installed. The coil is what heats the water intended for household use. Our stove can provide 120,000 BTU of heat. We chose a model larger than we needed so that it would not need to work as hard, thereby cutting down our electricity consumption.

The stove heats the house by circulating back to the house the 100 gallons of hot water that surround its firebox. This hot water is fed through a pipe that connects to a preexisting furnace.

If the home owner does not have a furnace, as was true in our case, the other options are a fan coil unit or baseboards. The coil unit consists of a

fan which forces air through a hot water coil. The hot air is then blown into the room to heat it.

We did not want the noise of the fan coil unit. We opted instead to hook the stove up to baseboards. Baseboards have the reputation of bathing a room in heat, the warmth gently radiating up along the walls. Baseboards keep the heat near the floor, where cold toes sit resting on winter nights. Because baseboards operate passively, they do not raise electricity consumption.

To provide for domestic hot water, a cold water line is fitted to the copper coil that rests in the walls of water that surround the stove. The cold water is then heated to 180 degrees while circulating through the copper coil. Once hot, it feeds back to the house to a pre-existing hot water tank.

We did not have an indoor hot water tank. We hooked our hot water directly to our faucets. When we turn on our tap, the water that comes out is scalding. Water that hot can be dangerous to children, however, so it's best to connect to a hot water tank.

When our stove was delivered, the manufacturer's instructions recommended it be set on a concrete slab at least 10 feet, but no more than 100 feet, from the house. If two buildings were to be heated, the stove was to be spaced equidistant between them. Ours is 80 feet from our house and 70 feet from our barn.

To bring the hot water for heat and domestic hot water to the house and to return the cold water back to the stove, two complete and separate loops of pipe are laid. The pipe needs to be made of polybutylene so that it won't corrode, leak at joints or deteriorate from the sustained 180 degree water. All fittings must be made of copper or brass, never steel (cast iron or galvanized). No rust must ever enter the system.

Our original plumbing system.

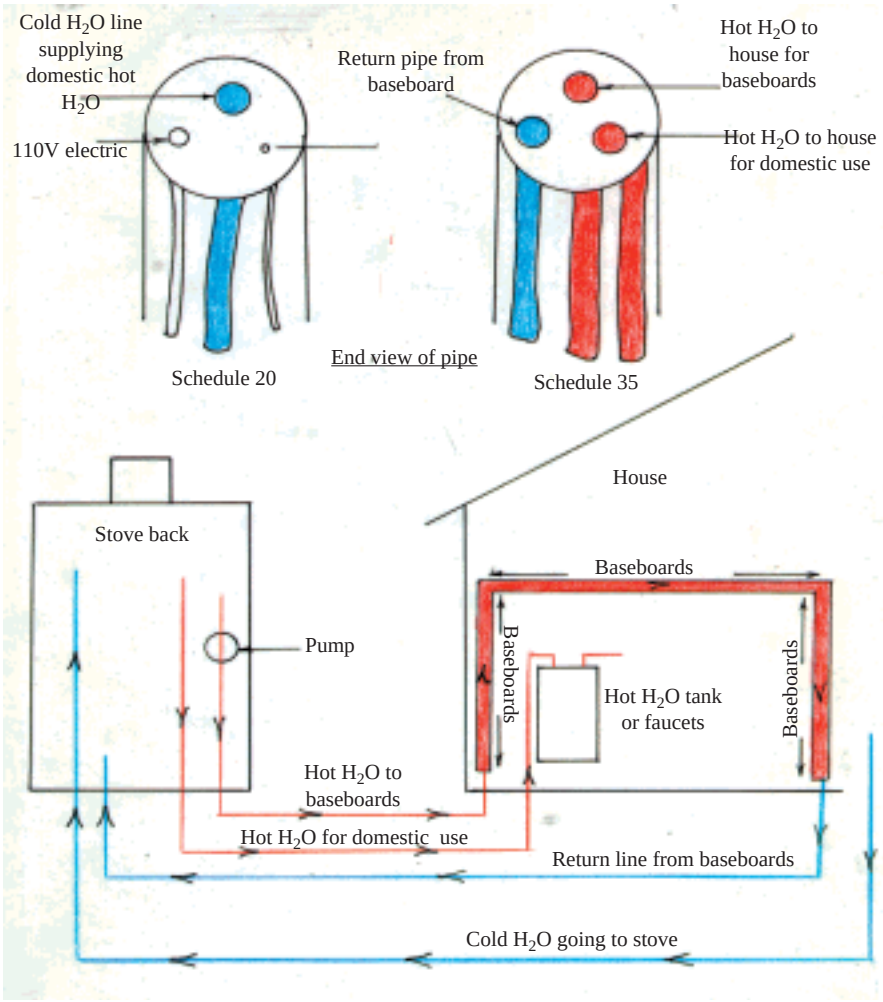


Diagram 1. Setup of our loops from the stove to the house

To lay the loops of polybutylene pipe, a trench from the stove to the house is dug. The trench must be dug deep enough that the pipe will lay below the frost line. The trench will contain the two loops of pipe, an electric line and a thermostat wire.

We set up our loops differently than recommended by the manufacturer (see diagram #1). The manufacturer recommends laying three of the four polybuytlene pipes into a schedule 35 pipe to provide additional insulation. They say that the cold water line that feeds the loop for domestic hot water, along with the electric power line and thermostat control wire, can lay directly on the ground in the trench. Instead, we chose to put the cold water line, electric and thermostat line into a separate schedule 20 pipe to provide extra protection.

Hooking up the polybutylene pipe to the back of the stove is straightforward (see diagram #2). The manufacturer provided easy-to-follow directions. If two buildings will be heated from one outdoor wood burner, a sec-

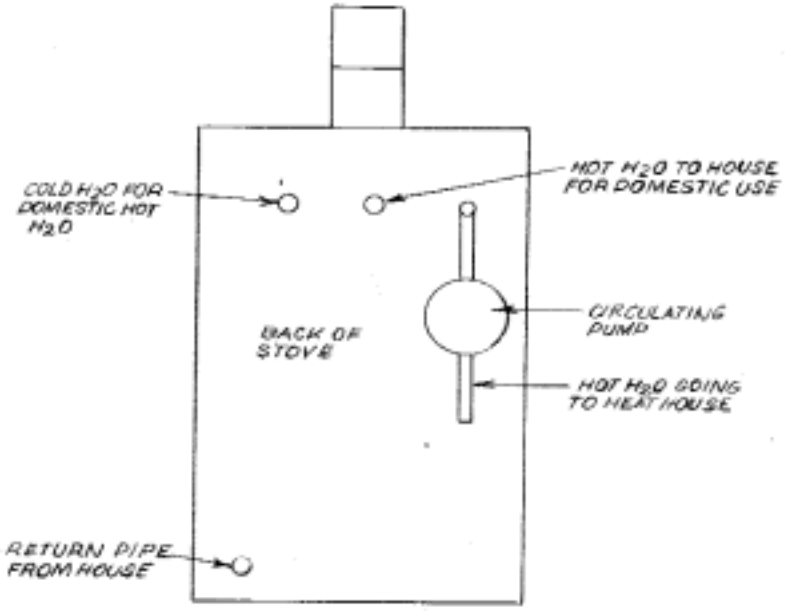


Diagram 2. Hook up the polybutylene pipe to the back of the stove

ond pump and additional ball valves will be needed.

Our wood burner takes firewood pieces as long as 30". During most of the winter, Mark loads the stove once a day, mixing in medium and large pieces of hardwood. When the temperatures are below zero, he fills the stove twice a day. In the spring and fall, when the baseboards come on only at night, Mark fills the stove every 36-48 hours. In the summer, when the stove is providing only hot water for household use, he fills it every three days. We use much less wood than we did with our indoor stove and outside wood hot water tank.

A conventional wall thermostat is wired back to the stove. As soon as the temperature in the house dips below where the thermostat is set, the pump kicks on at the stove and the hot water is circulated through the underground loop to the house and back. When the temperature of the water in the stove falls below 180 degrees, the fan kicks on and the firebox is filled with air. The fire begins blazing and the water is reheated to 180 degrees.

Heating our 1400 square foot log barn (with its 28 foot expanse from floor to ceiling) was a challenge. After digging a second trench and laying two more loops of polybutylene pipe, our budget was shot. There was no money left for baseboards or fan coil units.

Mark invented his own heating unit (see diagram 3) using car radiators. He removed two radiators from Cadillacs. Any radiator from any large car will suffice. Because his were not new or recored, he worried that there might be rust lodged inside the fins and tanks. Before using his radiators, he flushed them clean with “Iron-Out”. The first flushing Mark mixed one quart of “Iron-Out” in one gallon of water and poured that mixture into the radiators. The radiators need to be full to the top with the mixture. He let that sit overnight. Next morning he flushed it out with a high pressure garden hose. He repeated the process four more times until the radiators flushed out rust free.

Once the radiators were spotless, Mark soldered on the connectors that would join them to the polybutylene pipes. One radiator is connected to the incoming polybutylene pipe. The second radiator is connected to the outgoing polybutylene pipe. A short length of copper pipe between them connects the two radiators together.

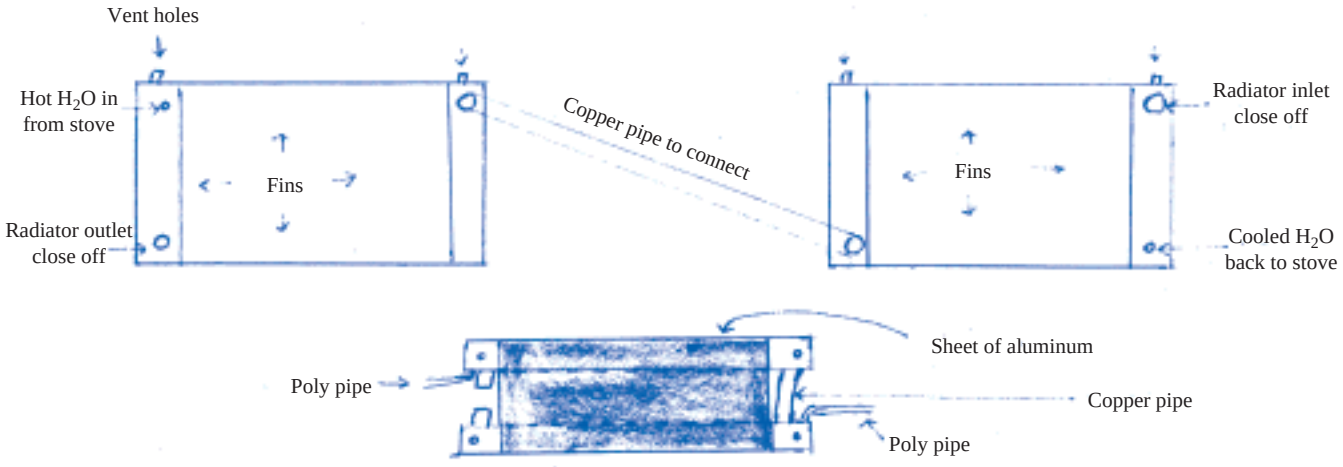


Diagram 3. A heating unit using car radiators

The radiators are joined by two sheets of aluminum. The aluminum acts both as brackets and providing a tunneling effect for the air flow. The 180 degree water is now ready to flow between the radiators. A squirrel cage fan from an old furnace placed behind the radiators lets the hot air blow through and heat the barn.

Mark only heats the barn when he is inside the barn working. All other times, the heat is off. When the weather is cold and the barn is not being used, the radiators must be protected from freezing. They can be drained of their water or, as in our case, stored below ground in the root cellar. If water is allowed to freeze in the radiators, they will burst.

For the past three years, we have used the outside woodburner. We have hot water running to both the house and barn. Mark can now degrease and clean his engines and tractor parts. I can shower off the horse with warm water after a strenuous summer ride. We can wash our greasy hands. A heated barn with hot and cold plumbing is a real luxury.

An outside wood burner solved all our heating problems. We use less firewood. Our electric consumption is unchanged. We have gained hours of extra free time because. we aren't building hot water tanks and hauling in firewood. Our house is much cleaner and it stays consistently warm in the wintertime, even if we're away from home all day. Best of all, the outdoor stove lets us grow old and be lazy and still have a good quality of life. Δ

Make lemonade without lemons

By John C. Fisher

0ne of the joys of living close to the land is the appreciation that a person develops for all plants in nature. One such plant is the sumac, also spelled sumach and pronounced either SHOO-mack, or SOO-mack. This is a group of small trees or shrubs belonging to the cashew family and to the genus Rhus. There are several species of sumac and they vary in size and area of the United States in which they grow. All have alternate compound leaves. Among the more common types are the staghorn sumac growing in the eastern U. S. from Canada into the south. The staghorn may grow into a tree of 30 to 35 feet. The dwarf sumach, which is usually a shrub, grows throughout the U. S. east of the Rocky Mountains. The smooth-leaved sumac, which also usually grows as a shrub, is found over much of the U. S. on both sides of the Rocky Mountains. These all have red berries in summer which grow in erect clusters. The poisonous sumac has white berries growing in drooping clusters and should be avoided. The foliage of the sumac turns a beautiful scarlet in fall adding much color to the autumn landscape.

The use of sumac berries was learned from Native Americans. They often dried them for use throughout the winter. The red berries can be used to make an attractive and good tasting drink. The berries should be harvested in mid to late summer, but before many heavy rains. The easiest way to harvest is to simply snip off the whole berry cluster or head. The berries are covered with many fine hairs which contain malic acid. This is what gives the drink its flavor. To make this drink, mash some of the berries in water, then stir them for several minutes. Strain the liquid through cheese cloth several times to remove the hairs. Now you have pink "lemonade" without using lemons. Sweeten the drink and serve as you would lemonade.

The juice from the berries can also be used to make a jelly. This is done by covering entire heads with water and steaming for 10 minutes. Pour off the liquid and strain. Add the same amount of sugar as juice and 1 box of pectin for 4 cups of juice. Cook until it begins to thicken. Remove from the stove and skim off the white foam on top. Pour into sterilized jars and seal or cover with paraffin. Δ

Build a bat house to control insect pests

By Robert L. Williams

If you want to attract bats to your property—and many people do, for a wide range of reasons—the simple way is to let the boards on your house warp a little and the bats will find their way into your attic. This holds true even if you hate bats and don't want them within a hundred miles of you.

What this tells us is that in many parts of the United States there is a large bat population, and these flying mammals will find a place to live. That place may be in your barn, attic, outhouse, or in a hollow tree. Given that choice, your best bet may well be that of building a cheap, easy, and effective bat house.

Before you haul out saw and hammer—or choose to disregard this article completely—spend a little time learning more about these strange, interesting, and often highly helpful creatures. You may decide that you would actually like to share your space with them. Even if you don't, odds are great that you will have bats around you no matter how hard you try to get rid of them. So it may be better to give them a place to live rather than have them invade and take up residence where you don't want them.

First, bats are not birds in any sense; they are mammals, and they have fur, not feathers. Unlike birds, they have teeth much like those of a mouse. Also unlike birds—and insects and most other creatures on earth—all bats fly, while some birds and many insects are flightless.

The bat reproduces like other mammals—much as human beings do—and generally, although this is not always the case, most female bats give birth to one offspring at a time. The mother bats have mammary glands which, as such glands do, produce milk for the baby bats' nursing grounds. Mother bats will often permit bats of other mothers to nurse, a sort of communal feeding trough.

Among the most common misconceptions about bats are the five following ones: they will fly down at people, women especially, and become entangled in their hair; they carry rabies and infect dozens or even hundreds of people each year; they

haunt church graveyards and tombs; and they are guilty of carrying parasites galore that will infest and infect human beings.

The final evaluation is that bats are vampire-like animals that are universal symbols of bad luck.

The facts do not tend to support the accusations. Yes, there have been instances in which bats have become entangled in the hair of women and men. Yes, bats can and sometimes do carry and spread rabies. Indeed, bats live in belfries and tombs. And doubtless there are instances in which bats spread parasites and pests to human beings.

But take a closer look, and then you may be ready to haul out the hammer, saw, and blueprints. Bats are, like most people, warm-blooded animals. When fully awake and active, body temperatures of bats may soar as high as 100 degrees up to 105 degrees. When the weather is extremely cold, the bats' body temperatures may drop to as low as 35 or 40 degrees. They cannot fly well when their body heat has dropped significantly, and they cannot fly at all when their temperatures drop too low.

So when the bats are not warm enough, they are clumsy and torpid, and they may in fact entangle themselves in people's hair, or tree limbs, poison ivy, or whatever else is there to get in their way. But they do not do it on purpose except in rare and very unusual cases.

Bats carry rabies, yes, but so do foxes, dogs, cats, raccoons, skunks, and even people. The difference is that bats' teeth are so short and small that they have great difficulty in penetrating the skin of most animals. It is nearly impossible for the common brown bat to bite through clothing or even unprotected skin. I speak as one who has been bitten too often by bats, and I have never had one break the skin.

The size of the common bat is surprising to most people, particularly those who have seen too many Bela Lugosi movies. The common brown bat weighs one-eighth to one-fourth ounce. To put this into perspective, the average North American bat weighs about the same as a nickel. They can squeeze into openings that are only one-fourth inch wide. A three-eighths inch opening is plenty of room for bats to enter an area.

As for haunting tombs and churchyards, remember that the bat must find a dark place to spend the daylight hours, and in many areas the old crypts and church steeples are good places for them. Odds are great that if they had a nice house, they'd live there instead. If you are worried about pests and parasites, remember that

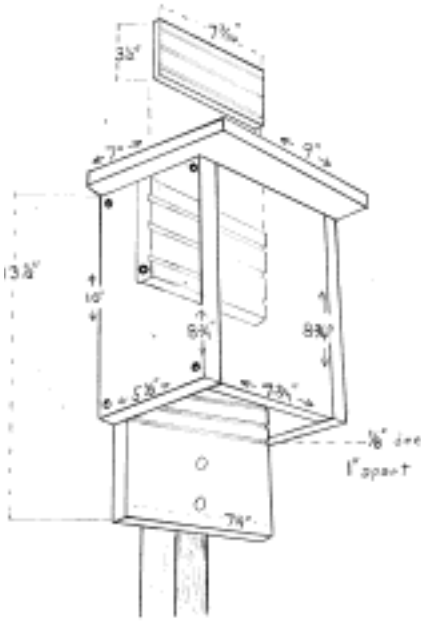
your dog and cat and other animals carry fleas, lice, and countless other parasites. The parasites carried by bats as a rule do not transmit readily to human beings.

The bad luck reputation attached to bats is unique to our part of the world. In many cultures, the bat symbolizes good fortune, great happiness, and longevity. In fact, while it is generally true that the smaller the animal, the shorter its life span, bats, which are among the smallest vertebrates encountered by man, often live up to 19 or 20 years, compared to the one-year life expectancy of the typical mouse or shrew.

The good luck charms associated with bats (and in the Orient a gift is often accompanied by a drawing of two bats to further emphasize the good wishes and fortune of the recipient) are wide-spread, and with good reason: bats kill not just hundreds or thousands but billions of insects each night. One single bat can make about 1,500 dives per hour, and the bat is amazingly gifted at killing its prey.

If we multiply the dives times the hours of activity, we can see that each bat probably kills 6,000 to 10,000 insects daily. You often hear that each bat kills about 10,000 mosquitoes daily, but this figure may be difficult to support, because of the 1,500-plus dives made each day, often the victim is not a mosquito but some other form of pest.

But regardless of the prey killed, the bats perform a useful service to people, particularly gardeners. But many people still cannot shake their fears of bats, which leaves only one basic solution: unless you live in a sealed environment, you will likely have bats in your attic, chimney, or other parts of the house. If you want to be bat-free, you can either poison the creatures, which is only slightly effective because even though some bats are killed others will quickly replace them. The best solution may be to build and install a series of bat houses that will serve to attract the bats away from your house and to the outside environment. These bat houses can be put up far from your house (Keep in mind, however, that bats, like homing pigeons, return to their roosts from as far away as 100 miles or more!) so that you are relatively free of worry and your garden is helped greatly.



A view showing the measurements of the bat house and the interior grooves that give the bats places to hook their claws so they hang while sleeping.

To build a bat house, use soft pine boards one-half inch thick and about 8 1/2 inches wide. Shelving boards slightly thicker work equally well.

Start with the back piece, which should be cut about 13 1/2 inches long and 7 1/4 inches wide. After cutting it, lay it on a work surface and with a circular saw or table saw cut a series of grooves 1/8 inch deep across it. Space the grooves about one inch apart.

Next cut the two sides, each of which should be 10 inches long on the tall side, 8 3/4 inches on the short side, and 5 1/2 inches wide. The sides can be grooved too.

Mount the sides to the back unit by using small nails or screws. The sides should be installed so that the back edges are lapped by the back piece.

Next cut the center piece which is about 3 1/2 inches wide and 7 3/16 inches long. Groove this piece on both sides. Install it vertically so that the ends touch the inside edges of the sides. When it is positioned properly, use nails or screws to attach the center piece to the sides.

These grooves, as you have guessed, are for the claws of the bats, which prefer hanging upside down to any other resting position. The "thumb" claw can hook over a slight edge or rough place in a surface and the bat can sleep soundly while hanging there. In fact, bats that die in their sleep will continue to hang until some force dislodges them.

For the front, cut a piece that is about 8 3/4 inches long and 7 3/4 inches wide. After the center section is installed, attach the front. It should lap the side pieces.

Finally, install the top, which is seven inches wide and nine inches long. Again, use screws or small nails. When this is done, the bat house is completed except for hanging or erecting it.

For best results attach the house to the eaves area of a barn or other outbuilding that is at least 10-15 feet high. The house should be protected from cats. You can also mount the house on a long pole and place it so that the front faces the south or southeast.

Leave the bottom open so that the bat droppings will fall to the ground. Be aware that it takes several weeks or even longer for bats to accept the house and begin to sleep in it. Bats are very wary concerning their resting locations, and they prefer not to have many human visits. And don't be surprised if millionaire playboy Bruce Wayne stops by for a visit. Just don't look for Dick Grayson. Bats have little in common with robins except certain parts of their diets and the power of flight. Δ

Cool your home with this simple device while you also meet your hot water needs

By Rev. J.D. Hooker

My first encounters with the possibilities of solar cooling came in the early 1970s shortly after my wife and I first married. For a few years we lived on Florida's swampy Gulf Coast. The winters there were great with temperatures that were never actually cold, and it rarely got hot. But the summers were a different animal—hot and humid, both with a capital H.

At least out-of-doors, you might catch a cooling breeze coming in off the Gulf. But once the ever-present mosquitoes (Florida's Gulf Coast is often referred to as the "Mosquito Coast") and other biting insects chased you back inside, if you didn't have air-conditioning, or at least a whole-house fan system, you just sweltered and suffered.

Several of the men I worked with, pouring concrete on construction sites, were outright "swamp rats." More than a few didn't have addresses or even any sort of roads leading back to their swamp-land homes. Their daily "commutes" to and from work included at least a couple of miles of travel by air-boat or out-board equipped canoe.

Though generally a pretty rugged and tough bunch, most of these men were pretty outgoing and friendly. Several invited us over to meet their families and to let me see how they'd adapted their own homes to temper Florida's intense summer heat.

All of their ingenious cooling systems were based on one very simple principal: that hotter air always rises, so heated air going out through the top of a flue must, therefore, draw cooler air in at its base.

Though I ran into several variations on this general theme, that same basic concept remained a constant with each individual cooling system they designed for their own homes.

The heart of these systems wasn't anything more elaborate than a large hollow chimney-like structure fashioned of wood, masonry, HVAC (heating, ventilating, and air-conditioning) leftovers, stuccoed palm blocks (a sort of cordwood masonry that consists of pieces of palm logs), or whatever was easily available. Near the top of the structure would be a large glazed window, often using Plexiglas or clear plastic sheeting rather than more expensive window glass. Opposite the window, the inside of this "chimney" was painted flat black and often this side of the structure's interior was lined with corrugated metal roofing to provide a little more heat absorbing surface area.

A large opening (or openings in some cases) near the bottom of the chimney-like structure formed an air inlet. As the black interior of this structure absorbed heat from the sun's rays, the temperature of the air inside increased. Once this heated air started rising upwards, exhausting through the chimney's top, air from inside of the dwelling would be drawn into the chimney through the bottom air inlet—which of course, would suck outdoor air into the house through the many doors and windows.

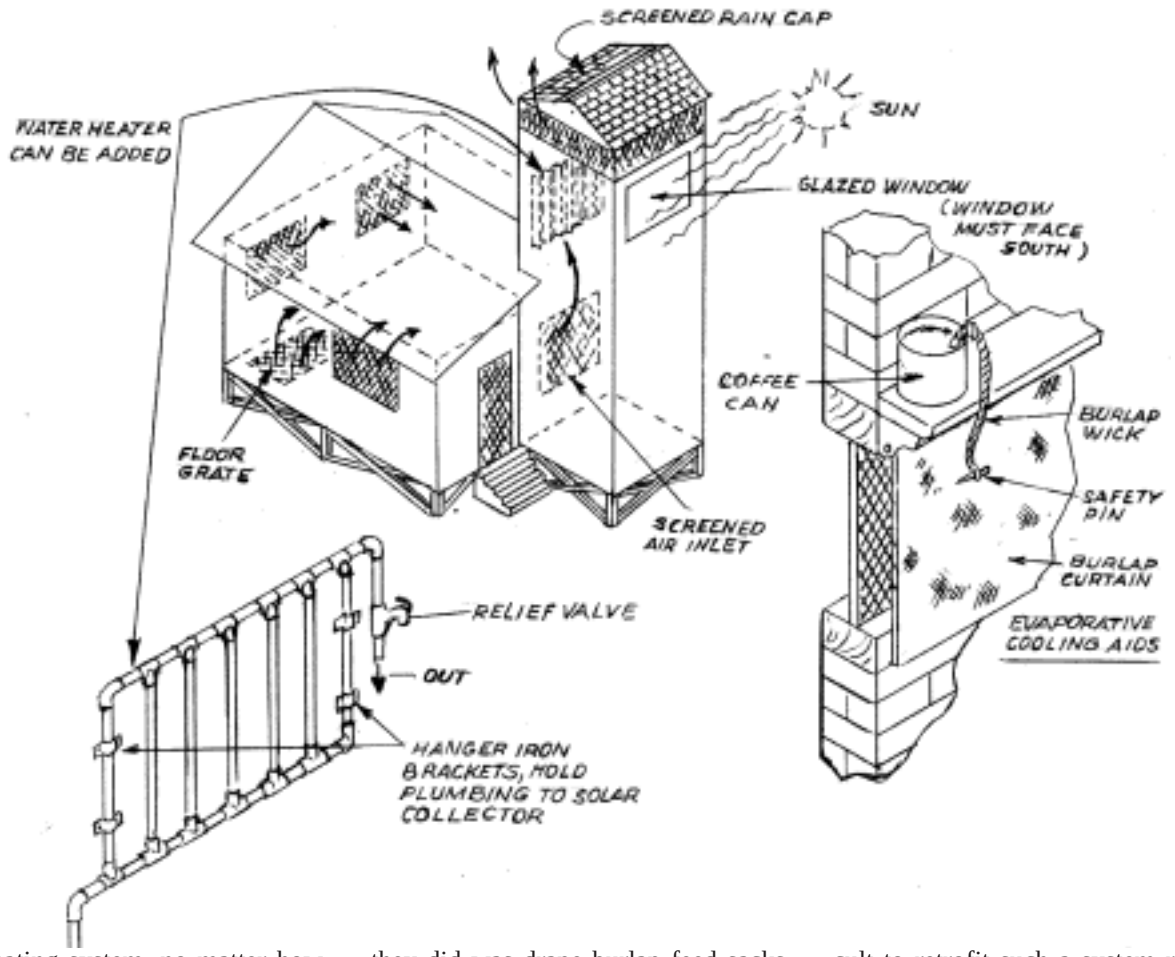
I should also mention that, in addition to having some sort of rain-cap atop the structure, each of these system also had every opening covered with fine mesh to prevent the ever-present insects from finding an easy way into the house.

All of the different parts of this system worked together to create a nice, sort of breezy, cooling effect which was remarkably similar to that of any electrically-powered whole-house fan system. Additionally many of these "backswamp homes," had been built up on stilts, off of the swampy ground. These usually had grate-like openings in their floors, allowing cooler air from the shaded area underneath the dwelling to be drawn into the cycle as well.

While several further improvements are readily adapted into this sort of system, the very first and most useful option I'd recommend would be installing the flat black "solar collector" to provide for your hot-water needs as well, especially since adding the heat-storing capacity of the water in such a system will increase the efficiency of the whole system anyway. The solar heat stored in the heated water is sufficient to keep the cooling draft and chimney effect working right on through the sunless nighttime hours.

Shown in the illustrations is one easy method for putting together a simple solar powered water heater for inclusion in this system. Using flat black painted plastic water pipe, in addition to the already black interior of the chimney, will increase even the daytime efficiency of the whole system a little while heating your water. By providing a somewhat faster air-exchange rate, a stronger, more cooling breeze will develop. However, black painted copper or galvanized water piping, or even dark colored garden hose, will work just about as well as the plastic pipe. So it should be easy to adapt your own ideas and available materials for use here.

I probably need to include a couple of short words of caution here. Even though many folks wouldn't think so, this or any solar water heating system can be just as prone to building up enough heat to cause an excessive build up of pressure, as can any other



water heating system, no matter how it's fueled. So, not including a relatively inexpensive pressure relief valve would just be like begging for trouble here. Also, while possibly unneeded in many tropical areas, in more temperate climates you'll need a means of draining and bypassing this system during the winter months.

Another valuable addition to the basic design is much simpler, and it's quickly put into practice. I first encountered this ingenious adaptation at the remote home of a long time friend who was a Vietnam War "tunnel rat" now turned Arizona desert rat. Along with his unofficial, immigrant "wife," he has raised a mess of unofficial kids (five boys, two girls, with no birth certificates, no hospital, immunization, dental, educational, police, or other records). All of them are as well adapted to their parched surroundings as any of the wild creatures sharing their desert domain. What they did was drape burlap feed sacks over all of the windows and doorways (covering the floor grates where applicable would also help) of his desert, dirt-hued, self-built rock and adobe dwelling. They set an old water-filled coffee can, pitcher, or other container on a shelf over each opening. They then attached a sort of burlap tail strip from the inside of the can to the burlap window covering where it was pinned. These tail strips act like wicks to keep the burlap curtains always damp, adding a constant evaporative cooling effect to the air drawn in through the doors and windows, and it kept the inside of his remote "owl-hoot" much more comfortable than I would ever have expected.

It also seems well worth pointing out that the more centrally you can locate such a system, the greater its effectiveness seems to be. But, while in many cases it might be pretty difficult to retrofit such a system right in the middle of your existing home, it's normally not very complex at all to center such a structure on one of the longer exterior walls.

Anyone considering including some sort of cooling system in their plans for any sort of a building should take a serious look at this type of solar cooling system. While this really can't approach the cooling effects of a standard electrically-powered central air-conditioning system, it can very readily equal the comfort level of any electrically-run whole-house fan system, without any monetary outlay for manufactured energy, and without any moving parts to break down or wear out. In fact, with only a little minor and occasional routine maintenance (repainting, recaulking, etc.) this type of system is capable of reliably providing free cooling and free hot water for at least a couple of lifetimes. Not a bad investment in my opinion. Δ

Substitute teaching — the pay is good, but it ain't always easy

By Don Fallick

I have a regular job that's not as regular as I would like, so I fill in by working part time as a substitute teacher. I work only the days I want, six hours a day. The work is not strenuous and pays $50 per day, even here in low paying Utah. If you like kids, easy work and a flexible schedule too, read on.

Requirements

Requirements for substitute teachers are easy to meet, but vary from state to state. Most states require at least some college, often a year or less. In Utah you must be 21 years old and have at least one year of college to be employed by a school district as a substitute teacher. But there are ways to get around this requirement. If you are employed by an individual school, all you need here is a high school diploma. To find out if you meet minimum requirements, call your local school or school district. Laws vary so much that there is no other way to tell.

Most districts require you to be 18 years old (21 in some states), and to have a clean police record, especially concerning child abuse. Every district I've ever applied to has required a fingerprint check by the FBI. I don't consider this too intrusive. I wouldn't want my kids supervised by a known child molester, either. If you can't pass such a check, please don't apply.

Surprisingly, your education need not relate to the subjects you want to teach. I studied English in college, but have successfully taught many other subjects. Nearly always, the teacher provides something for the students to do that doesn't require your expertise. Your main job is to take roll and enforce discipline. Glorified babysitting, really, but it pays much better than "real" babysitting.

You'll need to apply for the job a few weeks before the regular school term begins. You may have to attend a "training" session, but don't expect to learn anything about substitute teaching. Training covers pay schedules, parking regulations, and other employment practices. You'll receive an employee handbook and a map of the district. The "nuts and bolts" of substitute teaching you learn on your own or from other subs. Take heart! After a day or two you'll feel like an old pro.

Elementary/Secondary

Schools are divided into two categories—elementary and secondary. Elementary includes Kindergarten through sixth grade. Some Kindergarten teachers only have one session and only get half a day's wages. Grades one through six are usually six-hour "full day" jobs. You will generally teach the same class all day long, but the day will be broken up into "subject" periods: math, reading, etc. You will sometimes have recess duty on the playground. Discipline can be a problem in elementary schools, especially with fourth through sixth graders, and especially in bad weather. But it's usually not as bad as junior high school. Many subs love teaching elementary school, but admit it's harder work than teaching secondary.

Most secondary school teachers have to teach several different subjects. This goes double for substitutes! While the sub office will try to offer you classes you know something about, the real reason they ask for your preferred fields is to find out if you have any unique qualifications. For example, I happen to speak French fairly well. Since I'm the only sub in the district who does, any time there's a call for a French teacher, I get called. My experience writing for *Backwoods Home Magazine* has also helped me get journalism classes. So be sure to list your qualifications for any class you want even if they are not "official".

In general, you'll find that required classes are the least fun to teach, while "electives" are the most fun. The difference is in the students' attitude. Required classes have lots of discipline problems; electives, few. Beware, though: some classes that are called electives really are not. For example, most junior high students are required to take either Choir, Band, or Art. They have a choice, but are not really free. These classes have some of the worst discipline problems you'll experience. I find them harder to teach than Resource and Behavioral Disorder (bad kids) classes, because the classes are MUCH larger, and the potential for vandalism is greater.

A typical day

Let's say you have filled out all the required forms and are eagerly awaiting your first call. What will your day be like? My day starts at 5:30 a.m. with a call from Nadine at the substitute office. This morning, she offers me a choice: Resource at Brockbank Junior High, or English at Cyprus High School.

Resource is supposed to be a small class for students who need academic help, but in most schools it ends up being a catch-all for the students nobody wants, usually because of discipline problems. So I choose English at Cyprus. Nadine tells me the teacher's name, and I'm ready to start my day. I bring with me a brief case containing some puzzles and games I've collected over the years, for students who finish early. I also bring a red pencil or pen, a couple of regular pens, and two or three #2 lead pencils. I try to time my arrival for 30 minutes before class starts.

At school, I report to the office. The secretary tells me where to find the classroom, the faculty lounge, and the roll sheets, and gives me a folder containing a map of the school, the bell schedule, and other things a substitute

is expected to know. For example, if the school has printed discipline referral forms, a few will be in the folder. These days, most schools use "bubble" sheets to take the roll. These are similar to the answer sheets used in standardized tests, and are equally easy to use. That's what the pencils are for.

Taking roll is probably the most important activity of a sub's day, since school budgets are based on enrollment. Never lend pencils or other "office supplies" to students without security. They break them into bits and fling them at each other. They also make remarkable booby-traps out of staples.

The teacher's lesson plan is usually in her mailbox with the roll sheets, or on her desk. A really efficient teacher will tell you exactly what to do all day long. Elementary school teachers are generally better about this than secondary school teachers. A less efficient one may just say something like, "Show the Shake-speare video in my desk drawer." A really inconsiderate teacher may leave no instructions at all. One reason I like to get to school early is to allow time to contact the teacher (the office will call her for you) if I need more information than she gave me.

The information you receive will also tell you the teacher's daily schedule. It's best to go along with this, even if it would be more convenient to make a few small changes. Children are creatures of habit. It makes them much easier to handle if they know what to expect. Secondary schools divide the day into class periods, and you will have several different classes to teach each day.

Surprise! One or more of those classes may not be what you were expecting. Nadine said this teacher teaches English, and so she does. But she didn't tell Nadine that she also coaches the girls' volleyball team! Rather than risk trying to supervise twenty pubescent girls playing volleyball without blushing, I ask the secretary to arrange a trade with another substitute or even a regular teacher for that hour. Luckily, it doesn't happen until fifth period, so she has time to ask around. Early morning is a school secretary's busiest time of the day. She runs the school, so don't antagonize her with early morning demands.

Another item on your schedule will likely be a "Prep" or "Conference" period. Since you have no preparation to do for your classes, this amounts to a rest period for you—another benefit of teaching secondary school. Elementary teachers don't get prep periods. Instead, the whole school may have a weekly "short day", usually on Friday. The students go home after lunch, while the teachers stay and prepare for the next week. If you are called to sub on a "short day", you will go home early, but you won't be paid for a full day.

Some high schools are now going to "block" schedules, where each class is two periods long. The students attend only odd numbered class periods one day, even the next. This makes your classes about 90 minutes long, instead of the traditional 45. If you are lucky and the teacher's prep period falls on the day you are subbing you will only work four hours, but will be paid for the full day. Otherwise, you'll have to work the full six hours without a prep period.

Most secondary schools have two or three lunch periods each day, called "A", "B", or "C" lunch. It would be nice if your assigned lunch period were on your schedule, but it probably won't be. If the secretary doesn't tell you—ASK! The only other way to tell is to wait until nobody shows up for class. This can easily cost you five or ten minutes of your 25 minute lunch break. If you buy the school lunch ($1.50 or so), go directly to the head of the cafeteria line. Rank has its privileges. You may be required to buy your ticket before school starts in the morning. Again, asking is the only way to know. If you bring your own lunch, there's a refrigerator in the faculty lounge, as well as snack and pop machines and microwave ovens.

Playing the game

First period of the day is always a bit confused. Often the students are unaware that they will have a substitute until they see you. This is the time to get the drop on them in the age-old game of "Get the Sub". For you, winning means actually teaching somebody something. For the students, it means taking over the class. In a tie, you keep control, but they don't learn much. You get paid regardless—tie goes to the sub!

Pay close attention to the first couple of kids who walk into the classroom. A kid who walks in, greets you politely, and sits down is likely the teacher's pet. You can almost always believe what she tells you.

If a kid walks in, yells, "We got a substitute!" and runs out of the room, you've just identified the ringleader of the class, your chief opponent in the game. His strategy is always the same—be friendly but show increasing disrespect until he reaches the point of open rudeness. Before then, however, his buddies will begin to copy him, and the class will be completely out of your control. You can tell if this is happening by your own voice. If you have to shout, you are losing. If you are losing, call for help from a nearby teacher. Better to lose face than to lose control of the class.

The students never realize they are following a well-known pattern, so it's easy to circumvent their tactics. First, NEVER let the ringleader or his followers get away with the least bit of disrespect, profanity, etc. Don't be afraid of appearing mean or prudish. A reputation for meanness is one of the best weapons in your arsenal. You will almost certainly teach one of these kids again someday, and his wail of horror at seeing you will guarantee an easy class!

Second, never, ever lose your temper. If you do, you have lost the game.

The best subs don't even raise their voices. Some carry a little bell to ring, or some other attention getting device. I carry a gavel and a block of wood in my briefcase. But even flicking the lights off and on works, as long as the students know they have something to lose. I count the seconds it takes them to get quiet, then add them on to the class time at the end of the period. If it adds up to two minutes or more, I let them "work it off" by an equal amount of absolute silence just before the end of class. But I don't tell them this in advance. Dedicating the last five minutes of class for clean-up and quiet-down will reduce your stress a lot.

For individual infractions, the regular teacher usually writes the student's name on the board, with checks after the name for repeat offenses. Somewhere in the room will be a schedule of escalating punishments, based on the number of checks. I have found this doesn't work well for me, as I forget the students' names. Teachers are supposed to keep a current seating chart available for you, but they seldom do. In elementary schools, it's best to make a name tag for each child's desk at the beginning of class. In secondary schools, the classes are so large and the periods so brief, you can use up half the period this way. Junior high students should NEVER be asked to write their names on anything except graded assignments. Anything else they will take as an opportunity to write fake and/or obscene names. If you start seeing "Ben Dover" and "Anna Rexick", watch out! You are losing control of the class.

I prefer individual punishments that don't require me to know the student's name, such as making a litterbug "play janitor" by picking up all the paper on the floor, or taking him to a nearby teacher for the rest of the hour. (Clear this with the other teacher first!) Regardless of the official discipline policy, I give each kid three "strikes", then send him to the office. Of course, his buddies volunteer to "escort" him there, and you can bet they'll never arrive. I send him alone, but write his departure time on the referral slip and in my notes. I warn him that I'm going to check his arrival time, and I always do. I have NEVER had a student fail to arrive within three minutes. The troublemakers all know the way there! If you send your first period ringleader to the office right away, your reputation for meanness will get around, and you'll have an easy day. Some of the kids won't like you, but the good students will.

Tricks of the trade

The regular teacher knows her subject and classes intimately, and nearly always takes longer to cover a lesson than it will take you. So you'll often have time left over. You can allow the kids to study, talk quietly, etc. if you wish. They will be amazed that you turned out nice after all. Better yet, you can bring something for them to do that they will find interesting. I bring my guitar to school. French classes especially like learning "Head, Shoulders, Knees, and Toes" in French, or Christmas carols in season. Sometimes we serenade another class, with advance permission. All classes love to get substitutes talking about themselves, and sometimes I indulge them, but only after the lesson is done. Teens appreciate candor in adults, and enjoy the opportunity to find out what things are really like from someone who's been there. I may decline to answer their questions, but I never, ever lie to them.

As long as they're well-behaved, and are not taking a test, I let students work in groups of three or four. Much of the conversation has little to do with the assignment, but as long as there's actual learning taking place, who cares? I go over the answers at the end of class, anyway. Groups that are rowdy or loud get one warning, then I separate them.

Often, the teacher leaves a video for the kids to watch. They hate them, and so do I. Watching video's requires you to turn the lights off or down, giving the kids a wonderful opportunity to bedevil each other and you without being caught. Some teachers require students to take notes on videos.

In my experience, this seldom helps. The students fill up half a page (or whatever the requirement is) in the first ten minutes, then it's back to playing "Beat the Sub". If you must show a video, write questions about it on the board or pass out a worksheet, and warn them when each answer is coming up. Of course, you can't do this until you've seen it yourself.

If you have special knowledge of the subject, contact the teacher and ask permission to depart from the lesson plan. I've never been turned down. I tell geography students about my travels. I tell science classes about my alternative energy house. I tell English classes what it's like to be a part-time freelance writer. The possibilities are endless. Teachers will love you for bringing to their classes something special they cannot do themselves.

It's polite to leave the teacher a note, telling her how each class went, what material you covered, which students were especially helpful, and which need discipline. If you love a class, leave the teacher your phone number. If a whole class just can't seem to get with the program, I take a notebook around and start writing down the names of students who are on task, without saying why. Eventually, some will ask why they are being "written up", since they aren't doing anything wrong. I just quietly tell them that I'm making a "good list" for their teacher. Word spreads like wildfire!

It's fun playing these kinds of games with the kids, but it's even more fun when you manage to teach someone something they were having trouble with. And even if you "lose" once in a while and a class gets away from you, you'll still get paid just for trying. It sure beats working for a living! Δ

Wild garlic—independent and delicious

By Alice Brantley Yeager
(Photos by James O. Yeager)

Early food gardening is often begun for us by Nature herself when some very useful perennial plants appear known as wild garlic (allium canadians). These plants come up year after year no matter how miserable weather conditions may be and they demand no special attention. They are like old friends—dependable and there when you need them.

Wild garlic has had a place in our garden ever since my Uncle Ed gave us some bulblets many years ago. The parent plants had grown in his Greenville, Texas, garden and he thought they would do well in our southwestern Arkansas plot. His reasoning was that anything that would survive in his area would surely flourish in ours.

Uncle Ed was right. We have had more wild garlic than you can shake a stick at ever since the first bulblets started multiplying, as this savory herb is among the easiest and hardiest of perennial food plants to grow. In Zone 8 wild garlic comes up very early in the year—usually in January—providing us with delicious fresh seasoning until warm weather drives it into maturity and then dormancy.

We have gradually moved the wild garlic into an untilled area of the garden where it remains undisturbed as far as cultivation goes. Plants in the oldest clumps are about the size of a lead pencil at the base, and first-year plants are much smaller.

This plant is a North American native inhabiting a wide range of territory from Canada to Florida and west to Texas. It grows about 10-18 inches high and has a fresh, onion-like flavor. Unlike some domestic garlics, it does not haunt its user for two or three days after eating it. Wild garlic is easily distinguished from wild onions, as the garlic has a flat, grass-like leaf, whereas wild onions have a quill-like leaf and are not as tall as the garlic plants. Color varies, too. Garlic has blue-green leaves, whereas wild onion plants are lighter in color—almost yellow-green. The onions, being smaller, are more tedious to clean than the garlic.

Wild garlic will grow in full sun or semi-shade and has a unique appearance when producing its bulblets. This is a valuable culinary plant.

Cultivating wild garlic

Wild garlic is somewhat of a curiosity as it does not perform like its domesticated cousins. One difference is that it multiplies from bulblets that appear on top of a central stalk toward the end of the spring season. In this respect it resembles the growth habit of the Egyptian or tree onion. The stalk comes up from the middle of each plant bearing a thinly encased group of bulblets. As the tiny cargo enlarges, the paper-thin covering splits and a cluster of small bulbs is revealed.

Soon, scattered white or pale pink, star-shaped flowers are seen above the cluster and it is not unusual to see new shoots develop from the bulblets themselves if cool, moist weather continues. As the bunch of tiny bulbs grows heavier with maturity, the stalk will gently bend under the weight depositing the bulbs on the ground to await the coming of the next cool growing season. In time, bits of ground debris (dried grass, leaves, twigs, etc.) gradually cover the new bulbs giving protection from the sun.

The small bulbs may be allowed to mature on the stalks and harvested to be kept in a cool, dry place until fall planting time. When planted in rows, they would be spaced about two inches apart and covered with a thin layer of dirt. If winters are severe where you live, it might be advisable to plant your first bulbs after ground thaws in early spring and then let nature take its course. Until young plants are established, it would be well to keep rows free of weeds and grass. An organic mulch is very helpful.

There is no doubt that wild garlic is invasive. As new plants gradually take root beyond the parent plants, it may become necessary to weed them out of other rows. Discarded plants need not

Clusters of bulblets have just emerged from their thin protective jacket. It is through so many tiny bulbs being produced that wild garlic can "take over."

go to waste, however, as they may be cleaned, chopped and frozen in air-tight freezer containers or bags for later use.

Wild garlic is not fussy about soil so long as it is not overly rich and contains an ample supply of humus. I have seen the plants growing in both acid and alkaline soils. It will grow in full sun or semi-shade and is disease and insect free. I have often found this valuable herb growing in abandoned yards and out-of-the-way places emphasizing its survival skills.

Using wild garlic

An herb with more health benefits than wild garlic would be hard to find. Not only is it high in vitamins and minerals, but it has a history of being used for both food and medicine by Indians and early settlers alike. However wild garlic is not welcome in pastures belonging to dairy farmers, as there's no demand for garlic flavored milk or butter.

Wild garlic may be used in all dishes calling for garlic or onions. It peps up potato salad, tossed green salad, vegetable dips, omelets and so on. Combined with butter or sour cream it makes a delicious spread. (See recipe)

When aphids make an appearance in our garden, I have found a spray made of wild garlic most effective. Take a cupful of packed, coarsely chopped leaves (or 1/2 cup bulblets) and place them in a blender with about 3 cups of water. Blend into fine puree and strain through loosely woven cloth to remove particles. Pour strained liquid into a clean, sprayer-type bottle and spray on infested plants during a time of day that will allow them to dry off before nightfall. You may have to spray a second time, but you won't have to worry about killing off "the good guys", harming a child, or doing in the neighbor's cat.

Once wild garlic is established, it's independent and capable of taking care of itself. Unlike many plants, it relieves the gardener of any further task except for monitoring its desire to rule the garden.

Native food plants that give so much for so little attention deserve a place in our gardens.

Sources of supply

Meadows, abandoned homesteads, pastures, railroad right of ways, semi-wooded areas. (In other words, hunt for it. The outing will do you good.)

Wild garlic spread

Ingredients:

1 pound butter or oleo or sour cream
1 green wild garlic plant, cleaned and finely chopped
½ tsp. white pepper or freshly ground black pepper
½ tsp. salt (optional)

Method:

Soften the butter or oleo by letting it come to room temperature. Combine with the other ingredients until thoroughly mixed. Pack into a butter mold or bowl and refrigerate until firm. Just before serving apply a hot, wet towel to the outside of the mold to loosen the mixture and unmold it onto a serving plate.

This spread is delicious used on hot breads, baked potatoes, baked fish, and many other hot foods. Δ

A country moment

Sarah Reed cuddles a bunny.